ROADS and STREETS

Vol. 82, No. 7 July, 1939

A GILLETTE PUBLICATION
ESTABLISHED 1906

FIRST UNDERPASS IN WASHINGTON, D. C.

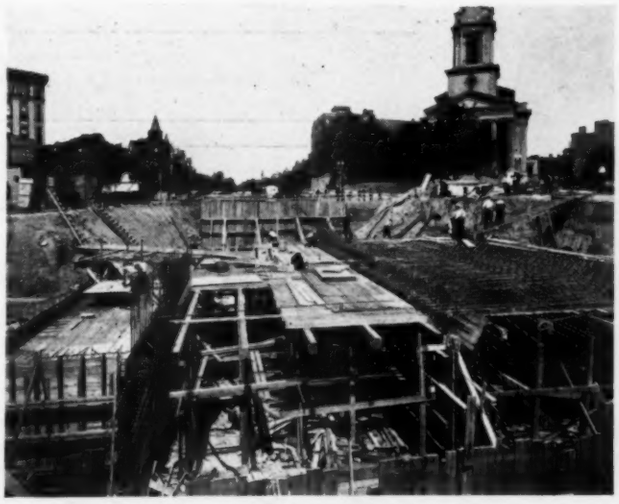
Will Have Carbon Monoxide Detector and Ventilating System

INCREASING traffic requires increased facilities for handling it if congestion is to be avoided and if exasperating expensive delays and accidents are to be reduced. One of the several projects in progress in the Nation's capital is the underpass now under construction at Thomas Circle. Upon completion, Massachusetts Ave. will provide fast traffic lanes under its point of intersection with Vermont Ave., M St., and 14th St. To add to the congestion, a double track street car line runs on 14th St.

This underpass will be the first of its kind in Washington and will be provided with carbon monoxide gas-removing equipment. There will probably be no cause for the operation of the automatic equipment unless from some accident, or because of fire lines, automobiles fill the underpass when no wind is blowing. Because of its length, the engineers for the District deemed the equipment advisable.

Two electric motor operated vertical pumps with automatic control and starting equipment will be placed in the sump for removal of surface drainage. Each pump will deliver 3,000 gal. per minute against an 18.5 ft. head. This will take care of the heaviest, very short interval rain ever recorded in Washington.

The Sheet Piled Section on the Left Is the Pump Sump. Photo Shows Foundation of Underpass.



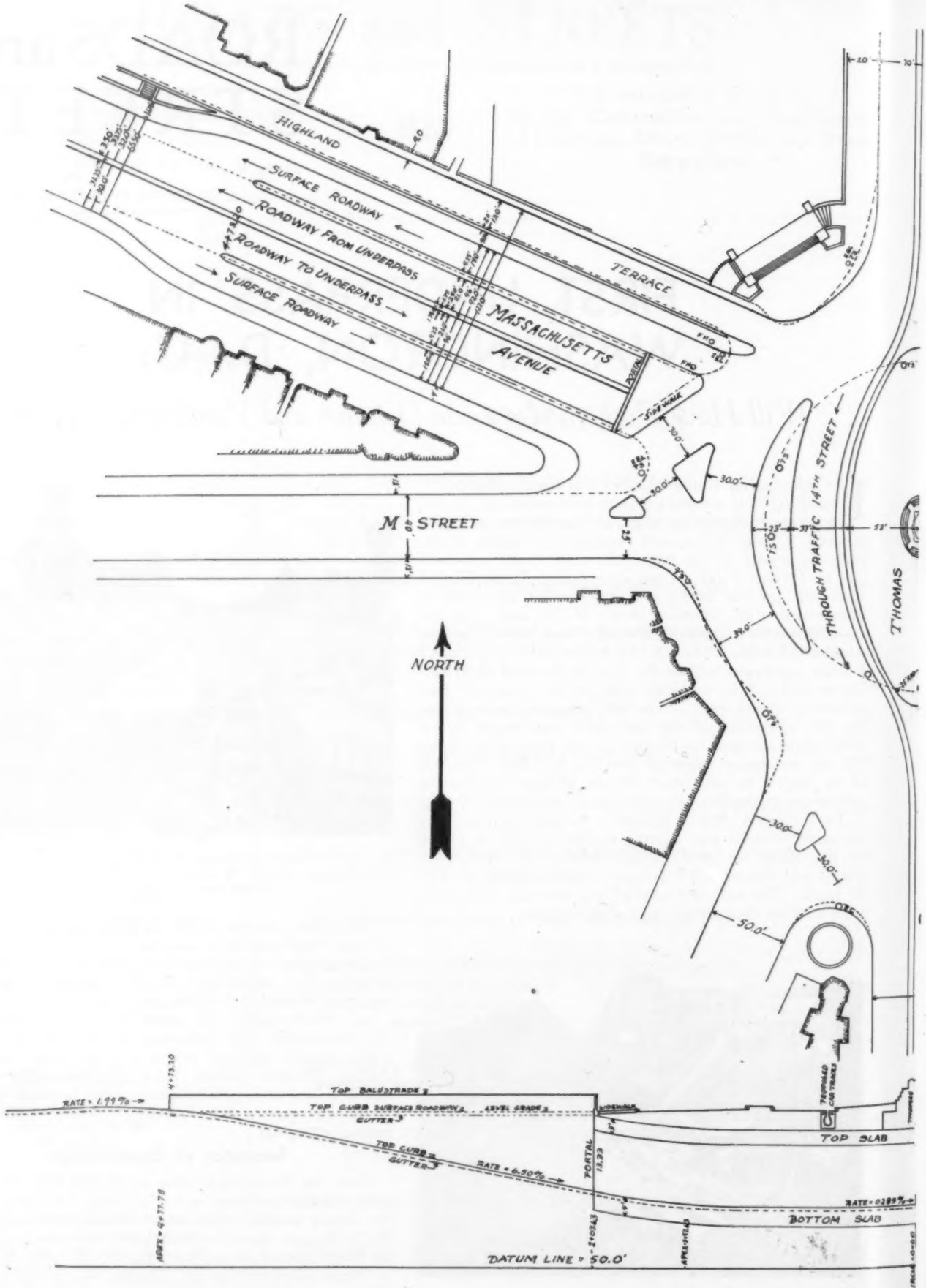
Note Deep Beam Section of Roof. Housing at Left Will Contain Pumps, Carbon Monoxide Detecting and Control Equipment, and a Control Room.

All utilities, besides street car tracks have to be moved. A large sewer had to be lowered and was passed through the foundation of the twin box underpass. Utilities existing in the subsurface, which required moving and replacing around the outside, are:

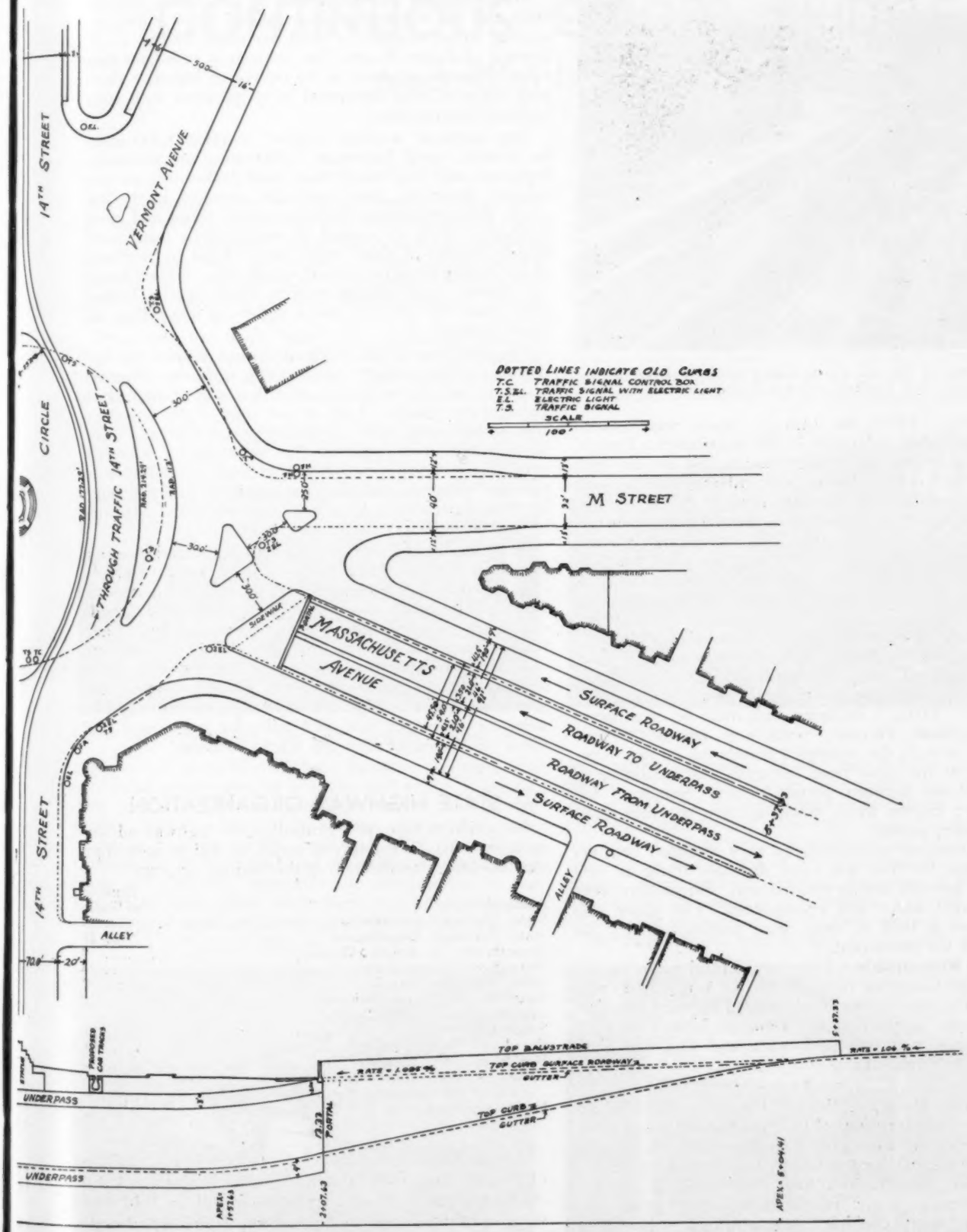
(a) Sewer mains, (b) water mains, (c) power lines for commercial use, including street light cables and traffic signals, (d) gas mains, (e) telephone ducts, including Western Union Telegraph lines, District fire alarm cables and police signals, (f) Postal Telegraph ducts, (g) power line furnishing power to the street railway company.

Sequence of Construction

First, the 36-in. water main conflicting with the underpass construction was removed. This was done during the winter months when water demand was low. When the underpass barrel is completed the water main will be reconstructed across the top of it. Second, the statue of Major-General Geo. H. Thomas was removed to the southwest within the circle but out of the way of construction. It must be replaced again in the center after



Left Half of the General Plan of the Thomas Circle Underpass. At the Bottom of Both Pages is the Profile of the Center Line of Massachusetts Ave. Between 13th and 15 Sts.



Right Half of the General Plan of the Thomas Circle Underpass. The Dotted Lines Show Conditions Prior to Construction. The District Owns All Property Back to the Building Lines. As a Matter of Policy the District Is Reconstructing All Sidewalks and Necessary Steps in the Front Yards of Existing Improved Property. It Will Be Noted That Provision Is Made for Two Lanes of Traffic in Each Direction on Massachusetts Avenue. Intersecting Traffic on the Surface Is Channelized.

Overall View of Thomas Circle Construction Showing Limited Storage Space and Facilities. Truck Mixed Concrete Is Used.

construction. Third, the 14th St. sewer was lowered and crossed the underpass in the foundation. Fourth, excavation for the underpass was carried out as open pit construction with sheeting and cribbing holding some of the faces. Then the foundation was built, followed by the upper structure, a twin box culvert approximately 55 ft. wide and 415 ft. long. The east approach is approximately 334 ft. long and the west approach approximately 270 ft. long. The elevation of the roadway at the middle of the subway section will be approximately 21 ft. below present grade. The approach roadway will be a reinforced concrete slab constructed between reinforced concrete retaining walls faced with 4-in. thick sawn granite. A solid dividing wall the full length of the box separates the two traffic streams of Massachusetts Ave. Fifth, a retaining wall must be constructed along Highland Terrace. Sixth, any one of the four approach of walls the underpass portals but no two opposite ones at the same time. Seventh, the remainder of the underpass between portals is next completed followed by; Eighth, finish work between entrance walls and between portals.

The contractor is working in very cramped quarters for storage facilities and must maintain traffic as well as utility services during construction. Fortunately, very little ground water was encountered. The upper slab of the box is built of deep beam section to carry the weight of the monument.

Those Responsible.—Director of Highways for the District of Columbia is Capt. H. C. Whitehurst, who has general supervision. Consulting Engineers are Parsons, Klapp, Brinkerhoff and Douglas, New York City. The contractor is James Stewart and Co., 230 Park Ave., New York City.

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STANDARD HIGHWAY SAFETY PROGRAM—Detailed description of the functions of the Standard Highway Safety Program for States, now endorsed by 46 national organizations, has been issued by the Automotive Safety Foundation, 366 Madison Ave., New York, N. Y. The seven essential points of the standard program are: legislation, motor vehicle administration, enforcement, engineering, education, training personnel and research. This 24-page booklet is intended as a handbook for public officials and others engaged in traffic safety work.

MOTOR VEHICLES TRAVEL 250 BILLIO[N] MILES IN 1936

Motor vehicles traveled a total of 250 billion miles in 1936 and the average vehicle traveled 8,870 miles, according to an analysis of road use made by the U. S. Bureau of Public Roads. The analysis is based on data from 17 states obtained in the course of highway planning surveys being conducted in cooperation with state highway departments.

The mythical "average vehicle" traveled 5,000 miles on primary rural highways, 1,190 miles on secondary highways and local rural roads, and 2,680 miles on city streets. However, there was wide variation in the use of the different classes of highways by urban and rural residents. Vehicles owned in small towns were used largely outside of cities while those owned by residents of the largest cities performed a large part of their travel on streets. All vehicles except those in the largest cities used the primary rural highways more than all other systems.

The analysis by the Federal bureau shows the importance of the primary roads to city residents. Seventy-one per cent of the travel on such roads originated in incorporated places. Only 4 per cent of the travel on city streets originated in unincorporated areas. The Bureau says it is apparent that provision of adequate rural highway facilities today is of major importance to the city motorist and that the required improvements in those facilities are largely occasioned by the city motorists' demands on the primary system.

Analyses of the average length of trips made outside city limits indicate that motor-vehicle use consists largely of short trips for passenger cars as well as for trucks. For passenger cars over 38 per cent of all trips outside city limits were less than 5 miles in one-way length and 65 per cent were less than 10 miles. Only 1.5 per cent of all trips outside cities went over 100 miles from the starting point. Truck movements showed similar characteristics. The average one-way length of trip was 14.6 miles for passenger cars, 17.4 miles for trucks and 15.2 miles for passenger cars and trucks combined.

▼

STATE HIGHWAY ORGANIZATION

No uniform type of organization for highway administration exists in the several states, as will be seen from the following classification of the various agencies:

Administration:	Number of States
State Highway Commissions	16
State Highway Departments	15
Departments of Public Works	9
State Road Commissions	4
State Highway Boards	2
State Highway Commissioners	2
Size of Administrative Bodies:	
Single Official	15
Boards of Three Members	16
Boards of Four Members	2
Boards of Five Members	9

Each of the remaining 6 states have commissions of the following membership: 6, 7, 9, 10, 11, and 14.

▼

AMERICAN PUBLIC WORKS ASSOCIATION TO MEET IN OCTOBER—The 1939 Public Works Congress of the American Public Works Association will be held Oct. 9, 10 and 11 at the William Penn Hotel, Pittsburgh, Pa. The offices of the association are at 1313 East 60th St., Chicago, Ill., and Frank W. Herring is executive director.

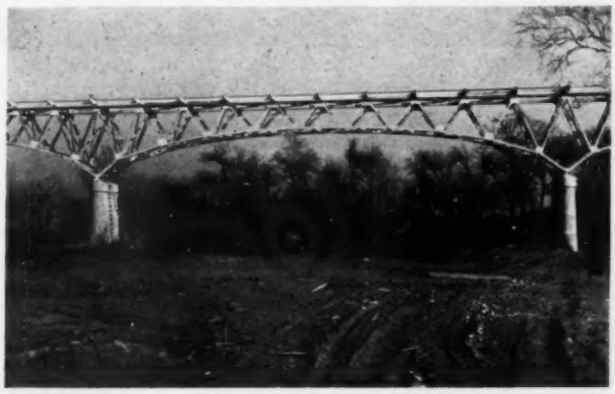
MARYLAND BUILDS WICHERT TYPE CONTINUOUS GIRDER BRIDGE

Jointly With West Virginia

By W. C. HOPKINS
Bridge Engineer,
Maryland State Roads Commission

IN the spring flood of 1936 the highway bridge over the Potomac River at Hancock, Maryland, was severely damaged. This bridge was acquired jointly about 15 years ago by the State Roads Commission of Maryland and the State Road Commission of West Virginia, and since that time has been maintained by the two states.

Following the flood, which demolished one span of the 3-span bridge, repairs were made to the existing structure and traffic maintained. The remaining portion of the old bridge was unsatisfactory both as to load capacity and width of roadway. Furthermore, there was a railroad grade crossing at either end of the structure. The two states finally agreed to build a new bridge farther upstream and at a location where the grade crossings could be readily eliminated. The State Roads Commission of Maryland was designated to prepare the plans and generally supervise the construction of the bridge and after much study there was adopted a patented type of structure known as the Wichert Continuous Bridge.



Continuous Wichert Type Truss Spans Over the Potomac River

This type of construction is readily recognized by the quadrilateral or four-sided figure formed by the steel members over every intermediate support. By properly proportioning this quadrilateral to suit any given outline of bridge, the stresses can be distributed to effect substantial savings in steel.

The Wichert type of continuous bridge, it is believed, retains all the advantages of the conventional rigid continuous bridge but does not have any of the undesirable features found in the latter structure. It is not subject to increase in stresses due to foundation settlement or temperature differences in top and bottom chords or flanges; and being statically determinate, the reactions and stresses can be determined with greater accuracy, eliminating tedious and voluminous design computations and without the necessity of weighing and adjusting the reactions as is the case of the conventional continuous bridge. These qualities, together with those of economy, performance and esthetic requirements, were the reasons for deciding in favor of the Wichert continuous bridge.

Maryland Approach Is Wichert Type Deck Plate Continuous Girders

The two Wichert type bridges at Hancock, one over

Wichert Type Continuous Deck Plate Girder Spans of the West Virginia Approach

Girder Span Piers Are Two Conical Shafts Connected by a Web Wall. Junction Piers Provide Pilasters of Modernistic Design

the Potomac River and the other over Tonoloway Creek and the National Pike, are part of the improvement of U. S. Route 522 in Maryland. Briefly, the layout of this project is composed of the following several units:

Potomac River Crossing.—A six-span Wichert continuous truss bridge with two end spans of 117 ft. 9 in. and four interior spans of 196 ft. 3 in.

West Virginia Approach Spans.—A five-span Wichert continuous plate girder bridge having two end spans 100 ft. 0 in. each and three 140 ft. 0 in. interior spans, one of which crosses over the tracks of the Baltimore and Ohio Railroad.

Maryland Approach Spans.—A five-span Wichert continuous plate girder bridge having two end spans 100 ft. 0 in. each and three 140 ft. 0 in. interior spans, one of

Tonoloway Creek Crossing Is Separated From the Main Structure by 400 Ft. Typical Highway.

which crosses the C. & O. Canal; and a seven span (308 ft. total length) steel beam structure over the tracks and yard of the Western Maryland Railway.

Tonoloway Creek Bridge.—A four-span Wichert continuous plate girder bridge with two end spans 130 ft. 0 in. each and two 160 ft. 0 in. interior spans. This structure is separated from the bridge in the preceding description by about 400 ft. of typical highway construction.

The main crossing over the Potomac River and its approach structures has a total length of 2,577 feet, and the Wichert girder unit over Tonoloway Creek is 580 feet long between end bearings. The entire bridge structure carries a 24 ft. reinforced concrete roadway and two 3 ft. sidewalks.

Trusses in the main crossings have a depth of 11 ft. 0 in. at centers of the spans and the quadrilaterals (or rhomboids) over the piers at 30 ft. 6 in. deep between pins. All steel work is located above the extreme flood water level and the roadway surface is about 85 feet above the river bed.

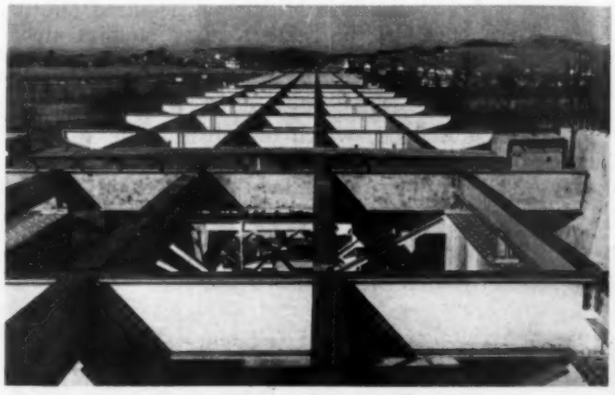
The Maryland and West Virginia plate girder units which adjoin the truss bridge, have a depth of 5 ft. 6 in. at the center of the spans and the quadrilaterals (or rhomboids) over the piers are 20 ft. 0 in. deep between pins. The Tonoloway Creek plate girder unit has a depth of 6 ft. 6 in. at the center of the spans and the rhomboids are 20 ft. 0 in. in depth.

The main river piers consist of a solid reinforced concrete shaft with semi-circular ends and their design provides for all forces due to ice and flood water pressures, wind, etc. Girder span piers are made up of two circular shafts connected with a web wall and the piers at the junction of truss and girder spans provide pilasters of modernistic design which effect a pleasing transition between the two types of construction.

The contract was awarded to George F. Hazelwood, Contractor, Cumberland, Maryland, and all superstructure steel is being fabricated and erected by the Bethlehem Steel Company. It is expected that the bridge will be opened to traffic this summer.

The Maryland State Roads Commission, at the time negotiations were consummated for the construction of this bridge, consisted of Dr. H. E. Tabler, Chairman, C. Nice Wilkinson and Frank F. Luthardt, Commissioners, while at this time the Commission is composed of J. Glenn Beall, Chairman, Elmer R. Jarboe and George F. Obrecht, Commissioners. Commissioner Burr H. Simpson of the West Virginia State Road Commission acted for West Virginia.

All of the engineering work done in connection with



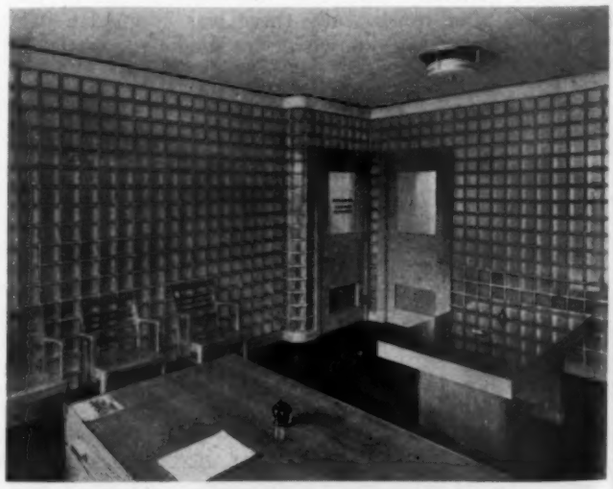
View of Deck Substructure

the design and construction of this bridge is under the supervision of W. C. Hopkins, Bridge Engineer of the Maryland State Roads Commission acting under the direction of Nathan L. Smith, Chief Engineer. C. Steuart Linville is the resident engineer.

The Wichert continuous bridge was invented and patented by E. M. Wichert of Pittsburgh; record owners of the patents are: The Wichert Continuous Bridge Corporation, Grant Building, Pittsburgh, Pennsylvania.

SOMETHING NEW IN HIGHWAY OFFICES

Glass blocks were used for subdividing office space in the Illinois Highway Department's District Engineers Office building at East St. Louis, Ill.



Insulex Partitions in District Engineer's Office Building, East St. Louis, Ill.

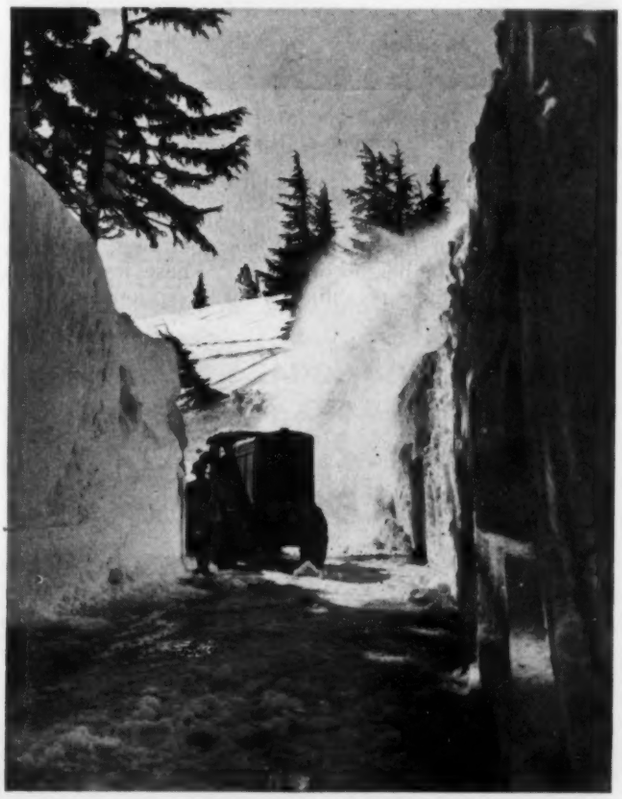
18 CALLING 9— SEND UNIVERSAL PIN TO 37-738

Mt. Hood, Oregon, Maintenance Station Calls for Repair Part for Snogo to Milwaukee (Portland Station). All Stations Are Numbered. 738 Is a Rotary Snow Plow Purchased in 1937

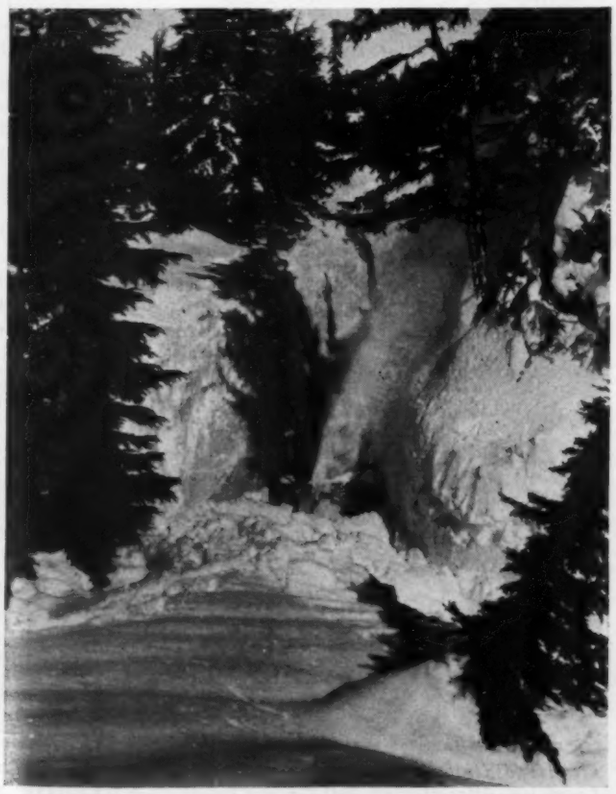
CONTINUOUS snow removal on definite through routes in Oregon practically guarantees uninterrupted travel across the Cascades and the rest of the Rocky Mountain area. A popular misconception still abounds in the East to the effect that the motorist had better "take the south route" to the West Coast in the winter time. Modern snow control procedure and traffic control methods in the snow belts, coupled with the now widespread use of two-way radio communication between snow fighting units and the base control stations make it possible for the motorist to take any one of the several principal roads to the West Coast and be certain of safe arrival.

Two years ago Oregon equipped the state snow fighting and snow control units with two-way radio communication, following the example set by Washington the year before. The state highway department and state highway patrol use the base stations jointly. Following is a list of the state highway department units:

The 1000-watt fixed stations are: Salem, La Grande, and Klamath Falls. The 500-watt fixed stations are: Bend and Milwaukee (Portland). The 100-watt fixed stations are: Roseburg, Coquille, Burns, Astoria, The Dalles, and Pendleton. The 10-watt fixed stations are located at Baker, Eugene and Grant's Pass.



After the First Opening Is Made, the Snogo Widens the Cut to Permit Two-Way Traffic.



Snogo in Action on Mt. Hood Highway. Heavy Snowfalls Are Immediately Fought.

Mobile stations are mounted on trucks and are designated as portable mobile radio units, which means that they may be used on the ground and moved from one place to another as well as being set up in a truck. This distinction is made by the Federal Communication Commission. There are 11 of the 10-watt units mounted on snow plows and in other vehicles.

All units operate on a fixed frequency of 1706 kilocycles.

Establishment of fixed station locations is governed, not only by travel on roads but also by dead areas caused by intervening mountains. It is impossible to completely eliminate dead areas for reception; however, by proper placing of land stations, coupled with locations of maintenance sheds, and need for communication in certain snow belts, the stations are fairly easily

On Level Stretches the Settled Snow Is Blown Clear of the Right of Way.

placed. The aerials on the mobile units are telescopic. When not in use they project just a short distance above the cab of the plow. When operating, however, they extend to a height of 36 ft. These long aerials are needed because of difficulty of reception not only

Note How Successive Snows Cause Drift Overhang. In Due Time These Are Cut Down and Blown Out.

because of mountains but because some of the snow packs are 18 to 25 ft. deep.

Maintenance Engineer J. N. Bishop says that he doesn't understand how they got along so long without the radio communication. He says they find it very essential. At present, 75 employees of the Oregon State Highway Commission are licensed operators.

At 9:00 a. m. every day road condition reports are broadcast. Necessarily, prior to this hour, the various substations are getting their reports which are radioed to Salem for consolidation in the Daily Radio Road Report. A sample of this report appears on the next page.

Every principal road in the snow belt is covered. Both radio telephone and radio telegraph is used. About a year ago the Federal Communications Commission changed their regulations such that for certain kinds of

Roughing Out a Cut Through a Drift on the Mountain Top.

business communication the radio telegraph would be used. That required operators to become proficient in the International Morse Code. Every station keeps a written log of all communication.

Radio communication for snow control work has undoubtedly, according to Mr. J. N. Bishop, prevented much highway transportation from getting snowbound, has prevented many accidents or suffocation from slides. Most bus and trucking companies are equipped with receivers to pick up the information. Oregon tunes in on Washington and California, as do these states on Oregon for transmittal information. The Salem, Oregon, station tunes in on Washington. The Klamath Falls, Oregon, station tunes in on the Redding, Calif., station. Likewise Redding tunes in on Klamath Falls. To do this with fixed frequencies requires that Klamath Falls mount a California frequency receiver and Red-

Mt. Hood Highway Maintenance Station Rotary Snow Plows Lined Up After Having Just Opened the West Road to Timber Line Lodge. They Finished the 18-Ft. Cuts About 10 P. M. the Night Before

Radio Road Report
Page 4

Ore.—No. 82—The Wallowa Lake Highway—La Grande to Joseph

Ore.—No. 86—The Baker to Homestead Highway

Ore.—No. 90—The Payette Spur

US—No. 97—Biggs to the California State Line via the Sherman Highway, The Dalles-California Highway, and the Klamath Falls-Weed Highway

Sample of Daily Radio Road Report.

ding install an Oregon frequency receiver. The same is true with the Washington interchange.

Snow Fall

On one road over which the writer traveled, the Mt. Hood highway, Oregon State Route No. 50, the following snow fall was recorded at Government Camp on Mt. Hood, along the highway:

1937-38 Snowfall.

Nov.—14 in., Dec.—43 in., Jan.—40 in., Feb.—71 in., Mar.—95 in. Total—263 in. 38 in. fell in one day.

1938-39 Snowfall.

Nov.—31 in., Dec.—36 in., Jan.—43 in., Feb.—115 in., Mar.—not complete when this article was written. Total to end of Feb.—225 in.

Snow Removal Costs, 1938-39.

Mt. Hood Loop—18.53 miles	$11,400
Wapinitia Hwy.—4.76 miles	4,100
Wapinitia Hwy.—22.13 miles	3,600
Total (to date of article)	$19,100

This is just one district alone on one main road. It is clearly seen that snow control for the benefit of highway traffic is a highly organized, expensive procedure.

Conclusion

Evidence presented in this article quite clearly shows that Winter travel to the West Coast from the East may safely be taken over any principal route. It is always safe to check with motor clubs as one approaches the mountains to be sure that some unforeseen slide has not blocked the highway temporarily.

One of the great benefits of radio communication is the rapidity of obtaining parts for a breakdown and the ability to transfer units from place to place as necessity requires at a time when other methods of communication are either inadequate or lacking.

▼

CRITICAL SPEED SIGNS ON ILLINOIS HIGHWAYS

Critical speed signs will be placed at curves and turns on all major state highways in Illinois. The signs, first installed late last summer on U. S. Highway 40 from the Indiana-Illinois line to East St. Louis, proved highly effective as a deterrent to accidents and met with the complete approval of the motoring public. Later they were placed on U. S. 36 Between Springfield and Decatur where motorists again found them helpful.

On the signs, which are white with 6-in. reflectorized numerals, speeds are indicated in multiples of 5, ranging from 15 to 50 miles per hour. Curves with safe speeds in excess of 50 miles per hour are not marked.

All critical speeds have been scientifically evolved and checked in actual practice by drivers operating cars equipped with airplane bank and turn indicators.

▼

NEW DIVISION HEADQUARTERS, OREGON HIGHWAY COMMISSION

Modern division headquarters for the Oregon State Highway Commission have been completed near the southern limits of the city of Portland, one of several similar buildings constructed for the commission at various points in the state by the Works Progress Administration.

In addition to this latest building, a one story rock veneered building, 66 ft. wide by 120 ft. long, with a basement, the project included construction of a 28-

Portland Division Headquarters of Oregon Highway Commission

car service garage, fencing, landscaping of the grounds, paving of service driveways and quarrying of rock that was used in facing the building.

The building and associated work cost a total of $118,250, of which the WPA supplied $80,500, principally for labor, and the Highway Commission $37,750. The office building contains four rooms for the state police; a radio room, toilet facilities; seven rooms for the highway engineers, including a private office for the construction engineer and maintenance engineer, a large drafting room, and a fireproof vault for the storage of records. The building is heated by oil fuel from a basement plant and the interior walls are plastered, with Douglas fir trim in natural finish.

Pictorial Presentation of Modern Equipment Constructing First Bituminous Stabilized Road Work in West Virginia

1 ... road

2

Building windrow

3

Measuring windrow

4

Feeding measured water

Mixing

On
State Route 7 in
Wetzel County, W. Va.
Murphy Construction
Co. Inc., Morgantown, W. Va.
built 9 miles of 3 types
of bituminous stabilized
road.

Burr H. Simpson
Director of Highways

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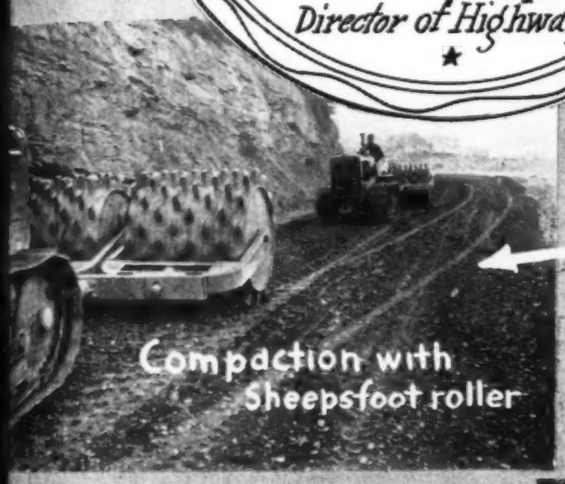

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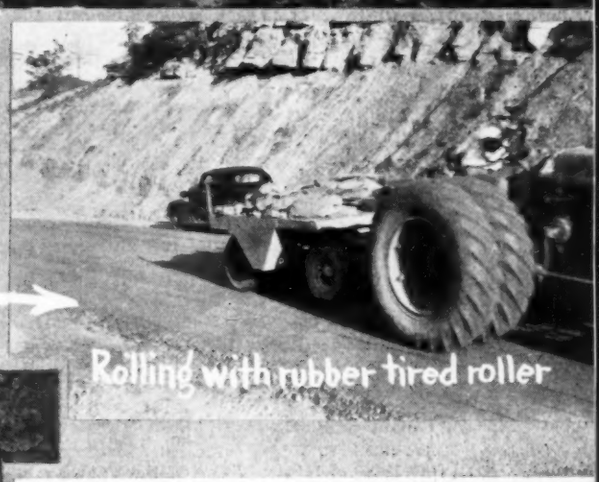

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OBSERVATIONS BY THE WAY

By
A. PUDDLE JUMPER

¶ Whenever you build a stabilized road job in clay, watch your water. I mean, watch the water you allow to get into the mix. It can easily ruin a good job.

• •

¶ Don't miss the General Motors exhibit at the New York World's Fair. Norman Bel Geddes has given the highway program a huge "shot-in-the-arm" with his portrayal of the Highways of 1960. It's excellent.

• •

¶ From shirt sleeve weather through a blinding blizzard and back to shirt sleeves was my experience about the first part of May as I went up and over Rabbit Ears Pass, then Berthoud Pass and down into Denver, Colo., all in about three hours. You may recall that Moffat Tunnel, on the Union Pacific R.R., goes through the mountain over which U. S. 40 passes at Berthoud Pass.

• •

¶ Could it be possible that alkalai soils so affect bituminnous surface treatments as to cause rapid pot-holing? I would make that deduction from observations as I race across the open alkalai flats of the Western states.

• •

¶ Miles and miles of light surface treatment surfacing have gone bad in Utah and Idaho. The thicker black top pavements have held up well.

• •

¶ One of Montana's new stenographers, according to The Center Line, "wonders how a contractor can afford to feed sixty cats."

• •

¶ Speaking of fine pavements, I must congratulate Pennsylvania on her new concrete pavements. Would that all other states could afford to build such fast traffic designs like U. S. 224 into New Castle from the west.

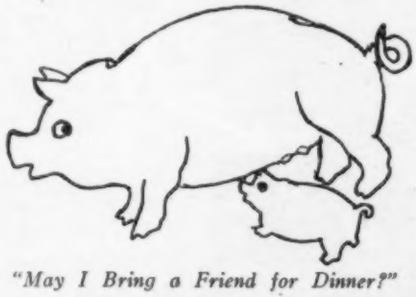
¶ Lost: One usual Spring. Finder please return about August 1

• •

¶ Just inspected the brick paving of the new Lincoln Tunnel from New York City to New Jersey. It's the smoothest, finest job I have ever seen. Inset porcelain blocks mark the center line edges of the two lanes. I understand the tunnel rises and falls about 8 inches at the center due to tidal pressure variations.

• •

¶ Hanging in the bridge design office of the District of Columbia I discovered the following pictures. Apparently one of the boys occasionally brought friends along to lunch on the boss.



"May I Bring a Friend for Dinner?"

"Don't Mind Me—I'm Surveying for a New Bridge."

¶ Outside of the environs of New York City I believe there's more road and street work in progress in Washington, D. C., than in any other city in the country.

• •

¶ Art Horner is a Colorado contractor. In talking to his shovel runner one day, said Art: "You give me a pain in the neck." Replied the shovel runner: "Thanks, Boss, for moving up."

• •

¶ Overheard at the Asphalt Institute Convention dinner:

Q. What is a realtor?

A. It comes from the Spanish words Real, meaning "royal" and Toro, meaning "bull."

• •

¶ The new paint jobs on those Monocacy River bridges in Maryland look fine.

• •

¶ Based on general observations from the miles of road I have traveled, I believe if I were a locating engineer I would strive to get a hillside location wherever possible. Meadows and flats invariably give rise to high maintenance costs.

• •

¶ Could that twisted, grotesque, distorted, metallic figure on the front of the Ford Building at the Fair be Mr. Ford's impression of the present administration?

• •

¶ My compliments to the maintenance foreman on U. S. 40 in Colorado. Every bad frost heave or pot hole caused by a frost boil or a frost heave was clearly marked by little red flags each way from the break. Good work!

¶ I heard an executive in New York praise the roads of Mississippi quite highly today. His recollection of those old rough gravel roads is now, as stated, merely a recollection. Give credit where credit is due. You've created a good name, Doug, for Mississippi.

• •

¶ This man Doug (E. D.) Kenna is a pretty good egg, even if he doesn't like A.P.J.

• •

¶ Had dinner the other night with Guy Atkinson and my friend who says he's a power shovel and mixer peddler. Guy is the guy who's building Grand Coulee dam. I've heard it said that next year he's going to make Grand Canyon look like a teacup. Anyway—I asked him about preformed wire rope. He said he doesn't buy anything else. He said the boys want only preformed. I thought that was an interesting comment.

• •

¶ Host to a bunch of hungry road-builders, directors of the American Road Builders' Association, at his Long Island lodge was (left) W. P. (Bill) McDonald, contractor of Flushing, L. I., N. Y., an ex-president of the association. Enjoying the week-end party was also Chas.

M. Upham (right), engineer-director of the association. Such a man's week-end I never spent before. When Bill does things, he does them big.

• •

¶ Maryland has made quite a bit of improvement to U. S. 40 in the last couple of years. Of course, a great deal more is still needed.

• •

¶ What's this rumbling I hear about a 2-year highway holiday in North Dakota. What a foolish idea, particularly there, as I recall the roads of North Dakota.

¶ Picking out their piece of steak as it broiled over the outside grate are, left to right, B. C. Heacock, Caterpillar Tractor Co.; Geo. Schlesinger, National Paving Brick Ass'n.; Lion Gardiner, Jaeger Machine Co.,

and C. A. Wold, Caterpillar Tractor Co.

• •

¶ And a gay Sunday dinner was enjoyed by the tired golfers. Bill got his head into the picture at the

end of the table at the left when A. P. J. yelled bloody murder. They tell me that this the first time that Bill ever "stuck his neck out."

• •

¶ Sam Beatty pulled a fast one on a group of the boys. He was carrying a cane in the lobby of Pennsylvania Hotel in New York City, just prior to going to the New York World's Fair. When asked about it, without cracking a smile he said the hotel furnished canes with registration. The group dashed off where Sam pointed. Twenty minutes later they came strolling into the Fair grounds with canes. They paid $1 apiece for them. Did Sam laugh!

¶ After the annual meeting of the American Road Builders' Association, W. P. (Bill) McDonald, Highway Contractor of Flushing, L. I., and former president of the A. R. B. A., invited the directorate to his farm for a week-end party and a day at the New York World's Fair. It was certainly a grand affair. Bill greased all the skids and all the players had to do was play.

Following is the ditty sung by the barber shop quartet to the tune of "Old McDonald Had a Farm" at lunch on Saturday.

Bill McDonald had a mule
E-I-E-I-O
He took the mule in place of school,
E-I-E-I-O.
With the mule he pulled a Western slip,
He steered the mule with an iron grip
E-I-E-I-O.

He bred the mule and he got a span,
E-I-E-I-O.
He bid a job like a great big man,
E-I-E-I-O.
There was too much rock and he lost his shirt
But he had the guts and he moved the dirt,
E-I-E-I-O.

He fought the crowd and he made the way,
E-I-E-I-O;
He became the prexy of A.R.B.A.
E-I-E-I-O;
He paved the Fair and he took his friends
To old Long Island for a swell week-end,
E-I-E-I-O.

(Slow)
Now McDonald has a farm,
E-I-E-I-O.

• •

¶ Once again I have the opportunity to compliment Ohio on some of their new road design and construction. U. S. 422 east out of Warren is as fine a piece of brick paving as one could travel. Curves are super-elevated for fast traffic and the 3-lane section is widened to 4 lanes where sight distance is shortened over a hill. It is a fine road, I think.

• •

¶ But what good is it to build such fine roads and then scare the motorist into 25 and 30 mile an hour speeds. I feel sorry for Pennsylvania motorists. Enforcement of the 50 mile an hour speed has caused them to become afraid of their shadows and consequently they clutter up the roads at 25 to 30 miles per hour in order to be safe.

If you drive your auto 30 miles an hour and get 15 miles to the gallon, gasoline taxes average about 11 cents per hour.

American Road

WASHINGTON, D. C.

MARDEN IS NEW COUNTY GROUP PRESIDENT

L. O. Marden, Worcester, Mass., county engineer, was elected president of the ARBA County Highway Officials' Division at the association's annual May business meeting in Washington, D. C. Mr. Marden, who joined the association in 1928, has occupied an official post with the County Division since that time. A graduate of Tufts college engineering school, his experience includes work with three western state highway departments. His last state engagement was as bridge engineer for North Dakota. He later became engineer of maintenance of way and structures for the Worcester Consolidated Street Railway Co., assuming his present position with Worcester County in 1923. Mr. Marden is also president of the Worcester Society of Civil Engineers and a member of the American Society of Civil Engineers.

Down the Road

By CHARLES M. UPHAM
Engineer-Director,
American Road Builders' Association, Washington, D. C.

SAFE AND SANE ROADS

I am an American. On Independence Day, these four words take on new meaning for every United States citizen. A red number on the July calendar denotes a day on which flag-waving is the favorite oratorical sport. The Fourth of July reminds us that America means independence for 130,000,000 men, women and children. This is every bit as true for each newly arrived immigrant, who came to America to find freedom to live, to work and to think as he pleases, as it is for the sons and daughters of the American Revolution.

Comedian Eddie Cantor, opening the 36th annual Convention and Highway Exhibit of the American Road Builders' Association in San Francisco, declared, "This is the American way, where men gather to plan roads for the enjoyment of people and not for the destruction of humanity." His statement is proved by the millions of citizens who celebrate the birthday of American independence by enjoying America's roads in the American way.

The broader issues behind the commemoration of July 4, 1776, may be overlooked in 1939, but the day still means independence in a special way to each member of the family. To mother, it may mean freedom from ordinary household cares. To father, it means freedom from the job which claims his entire attention on ordinary weekdays. To the entire family, it means freedom from town and usual surroundings—freedom to see the distant countryside—freedom to trade the heat of city streets and sidewalks for the cool of trees and wide-open spaces—freedom made possible by the roads that lead to new sites and scenes.

A vast majority of July Fourth celebrants include a motor trip in their plans for the day. It may be a drive of only a few miles to the park on the outskirts of town—it may be a hundred-mile trip to the seaside or one of the fairs. Contents of the family car almost always include a picnic lunch. There are also bathing suits for every member of the group.

July 4 means patriotism and pleasure. Too often it also means pain and peril. The holiday has its typical delights which, unfortunately, carry with them typical dangers. We have come to expect as inevitable the fact that our July 5 newspapers must carry numerous accounts of deaths and injuries from burns and drownings. As on all holidays, death strikes most often on July 4 where faulty roads fail to safely carry the holiday crowds to and from the beaches, amusement parks and picnic grounds.

Unfair taxation of American colonists was responsible for thousands of deaths in 1776. Unfair appropriation of taxes paid by American motorists to non-highway uses will be the cause of thousands of deaths in 1939. Many Fourth of July travelers meet death because of sharp curves, narrow roads, railroad grade crossings and other highway defects. Use of all special motor-vehicle taxes for the construction of better and safer roads will save these lives.

RECENT IOWA LEGISLATION AID TO SECONDARY ROADS

Iowa has been enabled to take advantage of federal secondary-road grants through an act recently passed by the legislature and signed by the governor. As there were formerly no statutes authorizing co-operation, the state has been unable to participate in the program. Under the terms of the new act, a farm-to-market road fund is set up in the state treasury. Counties will receive allotments from this fund in the ratio that each county bears to the total area of the state.

Builders' Review

JULY, 1939

Gasoline taxes increased from $56,930,000 in 1937 to $766,853,000 in 1938, despite a drop in registrations from 29,705,220 to 29,485,680.

With Our State Groups

TEXAS

Lowry Martin of Corsicana, Texas, president of the Texas Good Roads Association, with his entire panel of officers, was re-elected to serve for the ensuing year at the ARBA affiliate's annual meeting in Austin. New chairmen of the Texas State Highway Commission is Judge Brady P. Gentry of Tyler. He is a former judge of Smith County. The state highway department has authorized an appropriation to provide individual ARBA memberships for twenty-five district engineers. The department has held a state group ARBA membership for some time.

TRAFFIC AND SAFETY INFORMATION CENTER AT NEW YORK WORLD'S FAIR

A Traffic and Safety Information Center has been established at the General Motors "Highways and Horizons" exhibit at the New York World's Fair This center provides a comprehensive source of traffic and safety information for public officials, civic leaders, individuals associated with the profession and interested citizens. Through the co-operation of the American Road Builders' Association and other highway-minded organizations, a bibliography and references of tested current literature and opinion in the traffic-safety field are available. A sample copy of every publication listed in the bibliography is included in the literature of the center and may be inspected by visitors.

Walter A. Alsdorf

Walter A. Alsdorf, veteran road builder, died in Columbus, Ohio, on June 15. Mr. Alsdorf, whose seventy-third birthday came a few days after his death, served for many years as secretary of the Ohio Good Roads Federation. Funeral services were held from his Columbus home on June 17.

NEW ENGLAND

The New England Road Builders' Association, ARBA affiliate, is fighting a recent diversion attempt in Boston, Mass. Mayor Tobin has proposed that $1,000,000 in gasoline taxes turned over to the city by the state be used for non-highway purposes to reduce the property levy. The NERBA is working to arouse public opinion against the injustice and false economic reasoning inherent in this proposal.

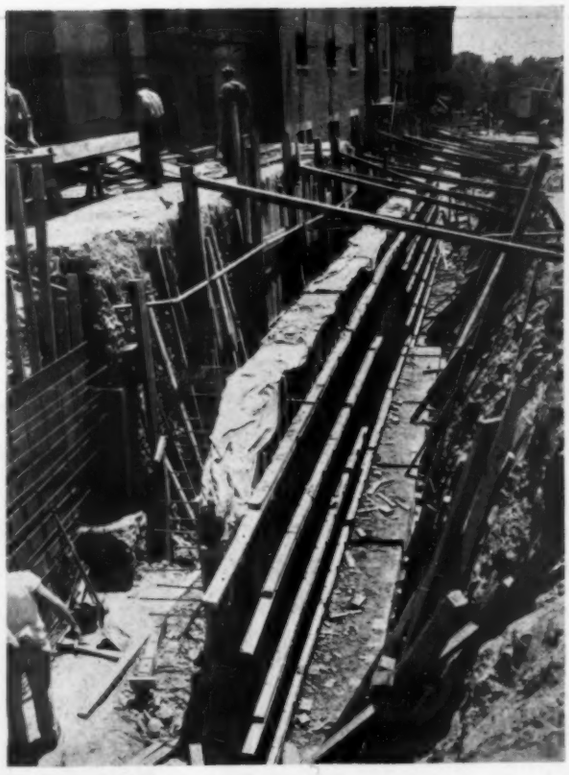
COLORADO

The Colorado State Highway Department has announced the recent publication of the 1939 edition of the Colorado highway map folders. Printed in five colors, these maps show 3,700 miles of hard-surfaced and 4,400 miles of gravel-surfaced highways. Pictures of scenic points and highways are included, as well as interesting information about the state.

A group of ARBA officials visit the Traffic and Safety Information Center in the General Motors "Highways and Horizons" exhibit at the New York World's Fair. Seated, left to right, are ARBA Manufacturers' Division President William M. Parrish, ARBA President and Michigan State Highway Commissioner Murray D. Van Wagoner, ARBA Vice-President Paul B. Reinhold and ARBA Contractors' Division President Herbert R. Anderson. Mr. Reinhold is reading a copy of "Road Builders' News" which forms a part of the bibliography on file at the center. Standing are L. B. Yost, manager of the Traffic and Safety Information Center; ARBA Assistant Engineer-Director William C. Slee, ARBA Director Robert B. Brooks, ARBA Treasurer George F. Schlesinger, ARBA Director Thomas H. Cutler, ARBA Past President Wm. P. McDonald and ARBA Engineer-Director Charles M. Upham.

WASHINGTON, ACTIVE HIGHWAY

Pennsylvania Avenue Bridge Over the Anacostia River, Washington, D. C., Now Under Construction. After One-Half of the New Bridge Is Completed for Use by Traffic, the Old Bridge Will Be Razed. The Other Half of the New Bridge Will Then Be Completed. Penker Construction Company, 1030 Summer St., Cincinnati, Ohio, Is the Contractor. Parsons, Klapp, Brinkerhoff and Douglas, New York City, Are Consulting Engineers. Capt. H. C. Whitehurst Is Director of Highways, District of Columbia.



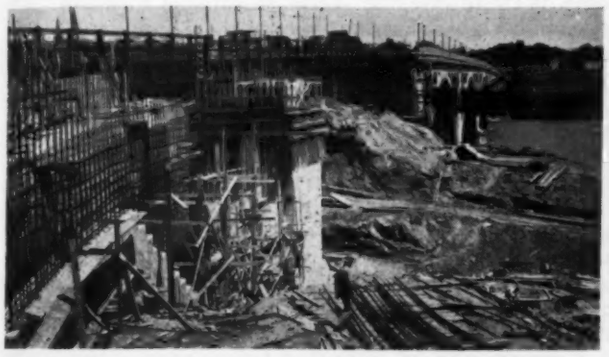
Retaining Wall Construction at 3rd and C Sts., N. W., by Reddick Construction Co., 1250 Owen Place, Washington, D. C., Is One of the Preparatory Jobs Required in Lowering Indiana Ave. and Removing the Existing Hill to the West of 3rd St., N. W.

Are Congress and the New Deal Hunting for Ways to Spend D. C. Federal Aid?

View of Construction of Washington National Airport Looking Toward Washington Monument. Air Terminal Is Under Construction by the Civil Aeronautics Authority Under Direction of the Interdepartmental Engineering Commission. Lt. Col. Sumpter Smith, Air Safety Board, Chairman; H. H. Houk, Engineer for the Authority. Mr. Houk Was Formerly State Highway Engineer of Alabama. Dredges Are Making Fill Such That Natural Subdrainage Will Result. An Additional Height of Dry Fill Will Be Added.

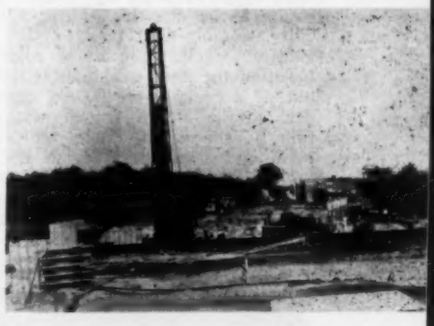
D. C. CONSTRUCTION CENTER

Thomas Circle Underpass Is a Double Barreled Culvert That Will Be Provided With Carbon Monoxide Detection and Removal Apparatus as Well as Automatic Pumping Equipment. James Stewart & Co., New York City, Are the Contractors.



To Provide Passage for the Continuation of George Washington Memorial Blvd. Along the South Shore of the Potomac Under the Key Bridge, a New Abutment and Wing Walls Were Necessary. Channelized Traffic Routes Will Approach the New South End of the Key Bridge. View Herewith Shows the New Construction and Where the Old Bridge Was Cut Off. Concrete Cylinders Which Support the Wing Walls Go Down to Minus 15 to Bed Rock. De Lashmutt Bros., Inc., General Contractors, Arlington, Va., Are Doing a Good Job. The Key Bridge Is Named After Francis Scott Key.

Lowering, Regrading and Paving of Indiana Ave. Between 2nd St., N. W., and 6th St., N. W., by the Highway Engineering and Construction Company, Washington, D. C. Requires a Large Amount of Equipment to Work in a Short Space, Sewers, Water, and Utilities Must Also Be Moved.



Providing an Outlet to the North Over the Pennsylvania Railroad Tracks Will Be the New Grade Separation Overpass on Taylor Ave. H. R. Dickens Co., Contractor, Philadelphia, Pa., Is Making Good Progress

Preparing the Site for the K St., N. W. Bridge Over Rock Creek. Temporary Bridge in Foreground Will Serve Traffic After Old Bridge Is Removed. Schiavi, General Contractor, Wilmington, Del., Is Doing the Job.

VARVES AND ROCK STRATA AS RECORDERS OF CYCLES

A Paper Read before the American Meteorological Society, June 29, 1939

By HALBERT P. GILLETTE

SYNOPSIS

A VARVE is an annual layer of sediment deposited in a lake or sea. Variations in tree-ring thicknesses often record weather cycles. So do varves, not only more clearly but often through vastly longer stretches of time. Moreover varves show the lengths of cycles between characteristic rock strata, thus enabling the researcher to find the lengths not only of short cycles in strata but of cycles millions of years long. Since many cycles of the same lengths are found in annual rainfall, tree-rings and varves, there is no doubt that varves are annual deposits in the bottoms of existing lakes. In Lake Saki a continuous series of varves goes back to 2300 B.C. or 1,000 years prior to the sprouting of the oldest tree. By means of this long series of lake varves, aided by varves in sedimentary rocks, the author has found the lengths of many cycles with greater precision than has been attained hitherto. These precise lengths have led to establishing several laws relating to cycles. Two of the most important laws are: (1) that many, probably all, weather cycles are harmonic; and (2) that cycles occur in triple-progression series, the number of which is great. In weather and climate the dominant series is one having cycles of 7, 21, 63, 189, etc., years. In sunspots the present dominant series has cycles of about 1.235, 3.71, and 11.12 years; but although this series exists also in weather its weather amplitudes are relatively slight. The existence of a great number of cycles accounts largely for the difficulties that have beset researchers in trying to unravel weather data, with the object of reducing to a system what seems to be chaotic. There are several other causes of difficulty, notably that many cycles differ less than 4 per cent in length. Cyclic influxes of solar electrons seem to the author to offer the best explanation not only of meteorological cycles but of correlated cycles in auroras, magnetic storms, compass declinations, ocean transfluxes, sea-levels, rate of axial rotation of the earth, "pole wandering," earthquakes, etc. Magnetic cycles cause cycles in the oblateness of the earth. The resulting effluxes of tropical waters at peaks, and the influxes of polar waters at valleys of those cycles, serve to explain recurrence of certain rock strata as well as weather and climatic changes.

Long cycles not only cause the most intense but the most prolonged droughts; but unfortunately man-kept records go back too short a time to throw much light upon such cycles. Tree-rings are far better for this purpose, in spite of their defects. Superior to tree-rings as cycle indicators are the annual layers of sediment, called varves, deposited in the beds of lakes and oceans. No varves recently deposited in the ocean have been measured, but varves abound in the solidified marine sediments that constitute rock strata. The use of varves to determine weather and climatic cycles will be discussed briefly after pointing out some of the defects of tree-rings for this purpose.

Annual tree-rings in semi-arid regions are apt to vary considerably in thickness, usually being thicker in rainy years. Hence they have been excellent sources of information as to weather cycles of moderate length. They have not been very satisfactory indicators of long cycles, one of the reasons being that as a tree grows older, its rings become not only thinner but much less sensitive to variations in rainfall. Since rainy periods are often cool periods, it follows that while rain tends to accelerate ring growth, the coincident lower temperature tends to retard it. Other factors also operate to make tree-rings not as satisfactory recorders of cycles as one could wish. Accordingly it has seemed wise to spend much time studying other types of Nature's cycle recorders, such as varves, rock-strata, recessional moraines and drumlins and raised beaches around lakes and along seashores. In general, geological phenomena not only are superior to tree-rings as recorders of cycles but some of them have the special advantage of showing cycles of such vast length that even the 3200-year-old sequoias of California seem, by comparison, to have a very short life.

Long before tree-rings began to be used as sources of information about weather cycles, certain varves had been recognized as being layers of sediment annually deposited in ancient lakes. I refer to the epochal discovery of varves in 1832 by an American geologist, Alfred Smith. But skepticism as to their being annual laminae held back for 80 years any systematic measurements of them until Baron Gerard De Geer of Sweden began his revolutionary investigations of varves deposited during the last Ice Age. However, almost a quarter of a century elapsed after that before anyone systematically measured many varves in the bed of an existing lake. Then Schostakowitch, Russian meteorologist, measured varves in the mud of Lake Saki, Crimea, whose measured dates go back from the present time to almost 2300 B.C. or about 1,000 years before the oldest California "big tree" began to sprout! Those varves record the effects of rainfall over a large area as compared with the small area covered by the very few "big trees" of great age. For this and other reasons the Lake Saki varves are, by all odds, the best known recorders of weather cycles that come down to the present time. But I doubt not that longer and perhaps better records lie buried in many an American lake and river delta, awaiting scientific study.

How can we be sure that varves are annual deposits? By finding in them many cycles of the same length that have been found in annual rainfall and tree-rings. This has been done. Five of the most useful cycles for this purpose are subcycles of the 63-year cycle, namely cycles of 21, 9, 12.6, 5.727 and 4.846 years. These all have coincident peaks every 63 years, the last being March 7, 1935. The Bruckner cycle of 35 years and its subcycles of 5, 7 and 11⅔ years are also very useful in establishing correlation between rainfall, tree-ring, varve and earthquake cycles. Their last peak was March 7, 1921.

So many cycles have every third rainfall peak higher that probably this is true of all cycles. The C series of 2⅓, 7, 21, 63, 189-year, etc., is the dominant triple-progression series of rainfall cycle. This was surprising at first, for it would seem more likely that the S series of 1.24, 3.71, 11.12-year cycles would be dominant in weather because it is usually dominant in sunspots; but the fact is that the amplitudes of rainfall cycles of the S series are small.

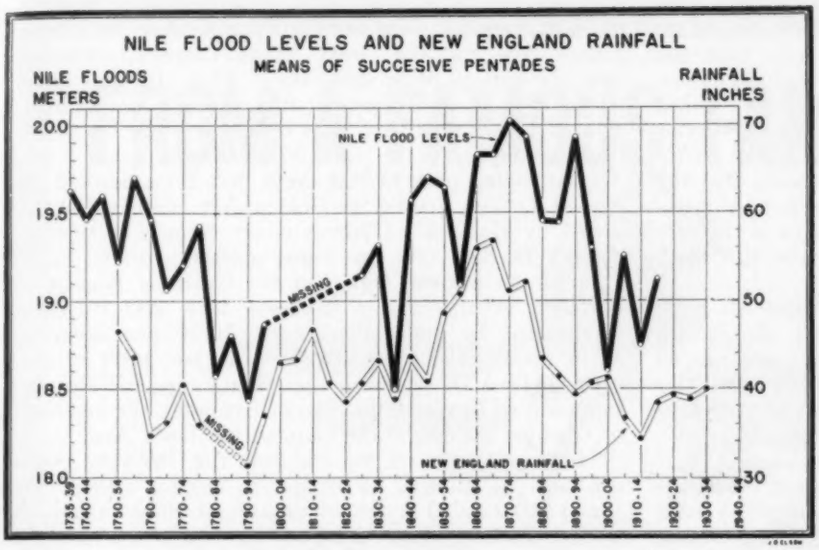


Fig. 1—New England Rainfall and Nile Flood Curves Showing Dominance of 189-Year Cycle.

Figure 1 shows the dominant effect of the 189-year rainfall cycle in New England and Africa. It had its last wet maximum in 1872, and its next dry maximum will be in 1966. The irregularities of the two curves in Figure 1 are due not only to the numerous shorter cycles but to local conditions such as those found in the positions of "permanent" cyclones and anitcyclones.

Apparently all cycles are harmonic and therefore at intervals have coincident maxima and minima. The long cycles are compound cycles resulting from the cooperative effects of harmonic subcycles. Hence the longer the compound cycle the greater its amplitude and the fewer the number of competing cycles of the approximate length of any given long cycle. This partly explains why geological cycles of great length are so outstanding that "he who runs may read"—if the runner will slow down his pace a bit.

In 1874 the late Prof. John S. Newberry, of Columbia University, under whom I had the good fortune to study geology, published "an epochal paper" on cycles disclosed in rock strata. He did not find the length of even one of those cycles, and it was not till 1929 that Dr. Wilmot H. Bradley, of the U. S. Geological Survey, published the approximate length of one cycle registered in rock strata. He found 16 pairs of beds of shale and limestone, each pair indicating a cycle. He measured about 500 varves in them; too few for accuracy where varves differ greatly in thickness, but enough to show that the length of this cycle is between 16,000 and 26,000 years. In a recent issue of the Pan-American Geologist I have given evidence indicating that its length is about 25,500 years. In the same magazine, but in another article, I have published evidence of geological cycles of 189, 567, and 1,701 years. Figure 2 shows all three of these cycles.

Varves in California rocks usually average about one-twelfth inch thick and are remarkably uniform in thickness in widely separated localities. No long unbroken series of varves, such as those in Texas rock, has yet been found in California rock, but the number, frequency and approximate uniformity of thickness of California rock varves are such as permit very accurate estimates of the lengths of cycles recorded by characteristic series of rock strata. For example, Fig. 2 shows a series of characteristic light-colored strata that are about 4 ft. apart center to center. Varves in these strata average about 140 to 145 to the foot. Hence this climatic cycle of sedimentation and coincident sea-level cycle was about 560 to 580 years. The photograph shows only eight peaks of this cycle, but there are two dozen more peaks in this same series; thus showing how persisting, as well as how regular, this cycle is. Usually every third peak is recorded by a thicker bed of rock, and frequently these thick beds are coarse-grained sandstone, which contrast strongly with the fine-grained beds between them. Between these characteristic light-colored hard beds there is dark-colored soft shale, in which there frequently occur thin beds of hard, light-colored rock about 16 in. center to center; these evidently record peaks of a cycle one-third as long as the next longer cycle. We have, therefore, in these rocks clear evidence of the cycles of 189, 567 and 1,701 years; for while these lengths are not determinable directly with great precision, the lengths of nine cycles in the triple-progression C series, ranging from about three and a half days to 63 years, are precisely determinable by aid of weather, tree-ring and lake varve data, thus making it highly probable that this C series continues onward with precision, giving cycles of 189, 567, 1,701 and 5,103 years. Not long ago, on a transcontinental trip, I saw a great many series of characteristic rock beds about 4 to 5 ft. apart center to center, indicating very wide prevalence of this prominent 567-year cycle.

In a recent article in the Pan-American Geologist the epoch dates of the 567-year rainfall cycle were shown

Fig. 2—California Rock Strata Showing Dominance of 189, 567 and 1701-Year Cycles.

to agree so closely with those of Pearson's sea-level cycle back to before the birth of Christ that there can be no doubt that the earth's crust rises and falls with the same rhythm that the rainfall increases and decreases. This indicates a common cause (probably cyclic influx of solar electrons) that produces both rainfall cycles and coincident changes in the oblateness of the earth

In the above mentioned article it was shown that the 189-year rain cycle is correlated both with a compass declination cycle and with the major changes in the rate of axial rotation of the earth found by the late Prof. E. W. Brown of Yale.

There is evidence of a climatic and sea-level cycle about two million years long. As a result, the shorter cycles above mentioned have written their records on the slowly rising or descending crust of the earth. By means of varves Prof. L. D. Stamp found in 1925 that the Oligocine Period was of this order of length.

By aid of varves Dr. Ernst Antevs found a 1700-year cycle registered by readvances of the ice-sheet during its last retreat up the Connecticut River Valley. I have found the same cycle, again and again, in rock strata. It is to be seen in Lake Saki varves, whose greatest thickness was about 2286 B.C. and 1116 A.D. Based on the dates of its short subcycles, rainfall peaks of the 1701-year cycle can be accurately determined as having been at those dates. Hence its next date of minimum rainfall will be 1966 A.D., which will also be a minimum of the 567, the 189-year and other shorter cycles of the C series. In historic times there has been only one other long drought period of intensity comparable to the one we now face, namely the one whose climax was in 265 A.D., about when the Roman Empire began to crumble, and when "wars in China were chronic."

In the semi-arid regions around the Mediterranean Sea, long climatic cycles have scribed their effects in the history of man even as in the history of rocks. The last three rainfall peaks of the 1701-year cycle are notable for their association with great periods of prosperity in that region. The Second Pyramid Age, the Cretan Palace Age and the Great Aryan Dispersal occurred near the rain peak of 2286 B.C. That also was about when the Nile flood levels at the Second Cataract averaged about 23 ft. higher than in recent times, as shown by hieroglyphs in the rock walls of that great river! The following peak of this cycle, 565 B.C., marked the rise of Greece toward its Golden Age, soon to be followed by the rise of Rome which became a republic about 509 B.C. At that time, according to C. E. P. Brooks, the present region of the Oasis of Kharga in northern Africa was a spacious lake 200 ft. deep, surrounded by many dwellings. It became populous again about 1700 years later. The last peak of this cycle, 1116 A.D., was near the Viking Age, the Norman Conquest of England, the Age of Crusades, the invasions of Ghengis Kahn and the close of the Dark Age.

Historic effects of the 567 and the 189-year cycles can also be shown. Prehistoric "culture cycles" are found in stratified layers where ancient cities existed, as at Crete where there are nine layers characterized by different kinds of pottery. These Cretan strata are probably due to the 189-year cycle, for it is estimated by archaeologists that this entire Cretan period embraced nearly 2,000 years. Recent excavations near Nazareth show twenty "culture layers" that are estimated to go back to about 3500 B. C.; so here again there is evidence of the 189-year cycle, since no other cycle of comparable length has anything like as great an effect on climate. Near each long drought due to this cycle it is probable that an invasion, destruction and abandonment of these ancient cities occurred. May not present worldwide struggles for "a place in the sun" be partly caused by the same cycle that hounded men for scores of centuries in Nazareth and Crete?

The first 900 years of the Lake Saki varve curve are shown in condensed form in Fig. 3. A strongly marked

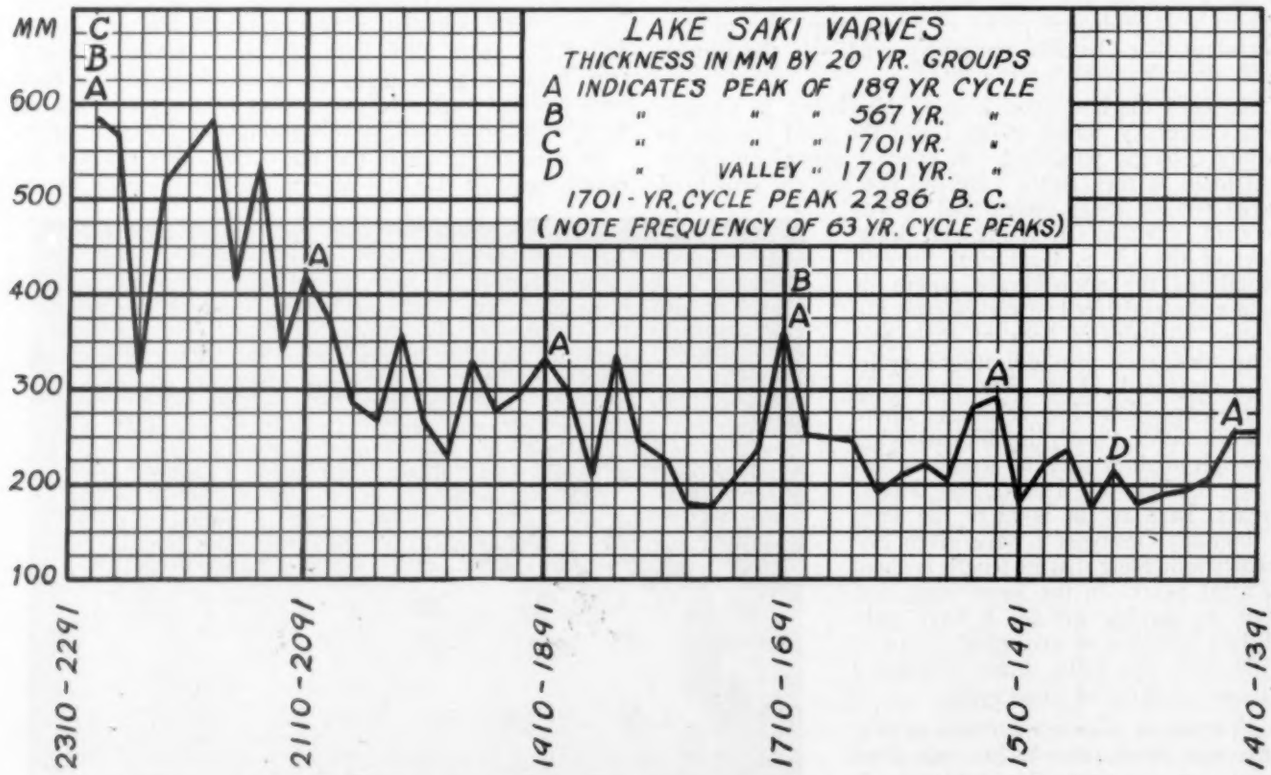
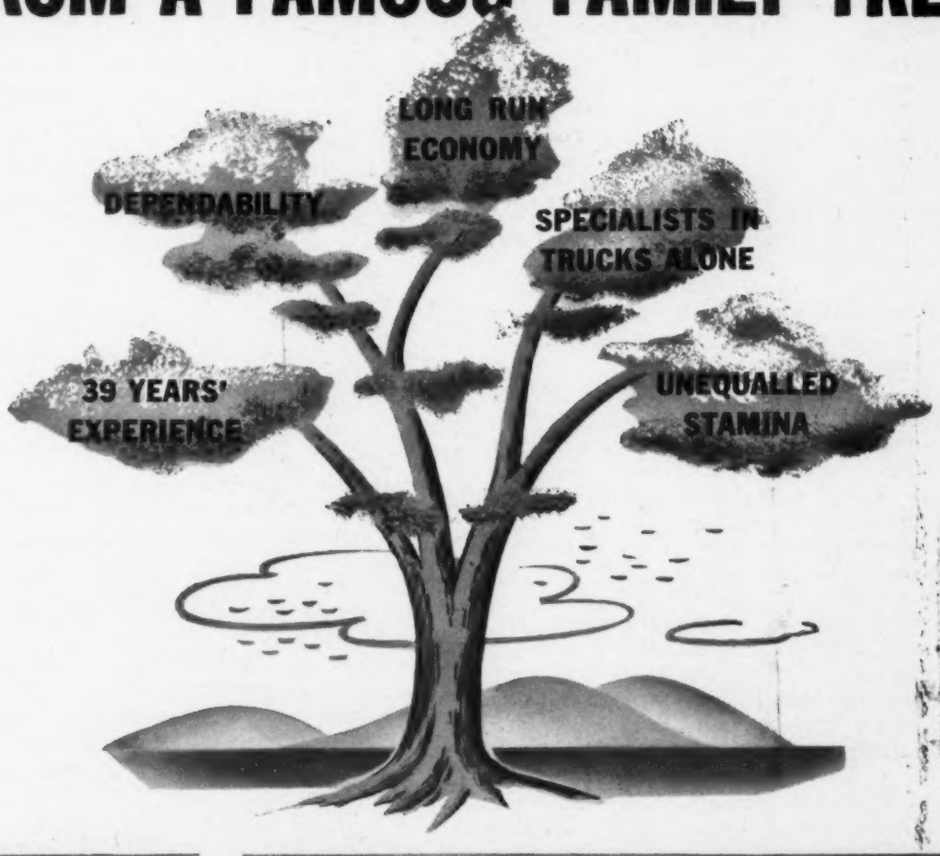


Fig. 3—Thickness of Lake Saki Varves by 20-Year Groups for First 900 Years. Peaks of 189-Year Cycle Marked A.

FROM A FAMOUS FAMILY TREE!



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FROM ONE TO THIRTY TONS . . . IT'S A Mack

peak and valley of the 1701-year cycle are to be seen. The 189-year cycle peaks, A, recur regularly; and even its 63-year subcycle peaks frequently are seen in spite of the fact that this curve shows only the thickness of varves in groups of 20 years. In a similar curve where the thickness of varves is given in 5-year groups, the 63-year cycle is very prominent.

During the past two years Mrs. Gillette and I have measured and photographed many such rock strata as are shown in Fig. 2, and have also measured hundreds of varves in the strata. This field work has been mainly near the California coast between Los Angeles and San Francisco. In that region there is a wealth of evidence of climatic and diastrophic cycles not only in surface exposures but in the logs of oil wells. The latter are especially useful in establishing both the length and the uniformity of the length of a cycle of about 25,500 years. Near cold peaks of the two-million year cycle, this 25,500 year cycle is an ice-age cycle. Also it is apt to be either an oil or a coal cycle that has an outstanding subcycle of one-fifth its length.

Although cycles of such vast length may seem at first to be only of slight importance to meteorologists, I believe that they are exceedingly important, especially because they throw light upon the basic question of the causation of weather and climatic cycles. Moreover they show, in the most striking fashion, the existence of the triple-progression law of cycle lengths. Although several meteorologists had seen some evidence of such a law in a few cases where the series of cycles was short, evidence that the triple-progression law might be universal first came to my attention as a result of studying rock-strata. Yet without the aid of long series of varves it would have been impossible to determine the lengths of many cycles with sufficient accuracy to give high probability to the triple-progression law of cycles.

Many cycles of approximately, probably exactly, the same lengths exist in several different kinds of phenomena. This is important because it throws light upon the causes of cycles. Correlation between two different types of cycles indicates either that the forces of one type cause the other type of cycle, or that both types have a common cyclic cause. The latter inference is probably correct as to most of these correlations. Cyclic influxes of solar electrons can be used to explain so many different types of terrestrial cycles that their basic cause appears to be electronic. Since electrons in motion are magnetic, there should be correlations between motions of the magnetic compass and weather cycles, and there are. There are similar correlations between transfluxes of ocean water, sea-levels, the length of the day and climatic cycles, few of which are explainable by cycles in solar heat radiation, and all of which are explainable by cycles of influx of solar electrons.

The surface of the earth and the sun's photosphere are both charged with negative electrons, possibly because great gravitative pressure within them converts more positive than negative ions into radiant energy. Cyclic influx of solar electrons into the earth's magnetic field increases its strength. This causes electrons escaping poleward from the earth's core to spiral with greater intensity around the earth's magnetic axis, thus increasing the magnetic field still more. One effect is to cause contraction of the earth in the direction of its magnetic axes. This should make the equator slightly elliptical, and it does; a peculiar fact for which there has been no explanation hitherto. The increased oblateness of the earth resulting from such a contraction at peaks of magnetic cycles causes effluxes of tropical waters toward higher latitudes, and converse influxes of polar waters at the valleys of magnetic cycles.

This theory is fortunately susceptible of test by appeal to facts. In the Pan-American Geologist, November, 1938, such a test was applied to the 567-year rain cycle; and its peaks were found to be correlated with Pearson's low sea-level epochs in low latitudes back to the birth of Christ; while his high sea levels were correlated with minimum rainfall of this cycle back to 260 B.C.

Turning from this very long climatic cycle to a very short weather cycle, again we find confirmation of the theory. There are sunspot and auroral cycles of one year, 1/3 and 1/9 year that have coincident peaks, March 7, about when the sun's south pole is most inclined toward the earth. Because fluctuations of major sunspot cycles tend to obscure minor cycles it is best, when seeking short cycles, to exclude years when spots are most numerous, leaving spot data embracing about 60 per cent of the total number of years since 1750.

The 1/9 year or 40.6-day cycle has magnetic peaks January 25, March 7, April 17, May 27, July 6, August 16, September 25, November 5, and December 16. Means of daily temperature often disclose these epochs; and most of them have long been proverbial.

On the New England coast the anomalous high temperature that so often occurs for several days near the end of January is called the "January Thaw," whose peak Nunn found to be about January 22.

An old English proverb is that "March comes in like a lamb but goes out like a lion," and the 40.6-day cycle now tells us why.

An anomalous "May freeze," or "Ice Saints" often occurs about May 10, according to Forbes. The 40.6-day magnetic cycle should cause an influx of polar waters about May 7, thus clearing up this mystery.

Another old proverb apparently relates to this peculiar epoch:

"If on the 8th of May it rain,
It foretells a wet harvest, men sain."

Scorching days, known of old as the "Dog Days," center about July 6 when a northern efflux of tropical waters is at its maximum in the northern hemisphere.

"St. Margaret's day (August 13) flood is proverbial and is considered to be well for the harvest in England."

"St. Martin's day (November 11) will bring out Indian Summer."

"Expect St. Martin's summer, halcyon days."—Shakespeare.

"The fourteen halcyon days then began (Dec. 11), days in which in the Mediterranean calm weather was expected, so that the halcyon or hawk could, it was supposed, make its nest on the surface of the sea."—Virgil.

In 1884 Clayton published the discovery of a pressure cycle slightly longer than two years which had marked oscillations for about 10 years after 1874. The existence of a weather cycle of about two years has been independently confirmed by at least a score of researchers. Dr. C. F. Brooks (1921) found a marked two-year oscillation in winter temperatures in northeastern United States between 1872 and 1884. Otto Pettersson (1896) had previously found a similar oscillation of sea temperature in the northeastern Atlantic, 1874 to 1894, with a break between 1885 and 1888, the even years being the warmer. The Arizona pines at about the same time show thicker rings in even years, and San Diego, Cal., seasonal rainfall harmonizes with the pine rings. At about that period the compass in certain regions shows a two-year declination cycle, which gives significant sup-

Three-year Maintenance Costs at Richmond, Va.

MAINTENANCE EXPENSE OF PRINCIPAL TYPES OF STREET PAVEMENTS IN RICHMOND, VIRGINIA

From Annual Reports of the Director of Public Works for 1936, 1937 and 1938

Item	Year	Vitrified Brick	Type A	Type B	Type C	Type D
Total Square Yards	1936	282,726	1,237,256	72,137	180,984	42,446
	1937	291,285	1,255,413	72,137	182,413	42,446
	1938	308,166	1,321,786	72,137	195,754	43,225
Square Yards Replaced	1936		33,487	2	3,951	0
	1937	16	5,650	60	1,365	55
	1938	6	6,201	72	1,147	32
		9				
Total Maintenance Cost	1936	$23.47	$40,505.67	$4.46	$8,383.54	0
	1937	19.13	15,298.38	272.87	4,358.80	$258.83
	1938	28.89	16,028.04	310.88	3,969.65	144.89
Unit Maintenance Cost Per Square Yard	1936	$0.000083	$0.033	$0.000062	$0.046	0
	1937	0.000066	0.012	0.0038	0.024	$0.0061
	1938	0.000094	0.012	0.0044	0.0203	0.0034
Maintenance Cost Per Square Yard	3 Year Ave.	$0.000081*	$0.019	$0.0027	$0.030	$0.0032
Comparative Index	3 Year Ave.	1	247	33	370	40

NOTE—*Surface Courses on Concrete Bases.*
*"Maintenance due to causes other than the failure of the Vitrified Brick."

"BOX-CAR DECIMALS" *used to give square yard maintenance cost of Brick.*

Photo is South 2nd Street, Richmond, Va.

CASE HISTORIES are always interesting. They are devoid of generalities. And the 3-year case history of maintenance costs of various pavement types at Richmond, Va. is especially so.

Other pavement types were found to cost from 33 to 370 times as much per square yard to maintain as brick.

Look at that "box-car" decimal that is used to give a unit maintenance cost for brick—four ciphers between the decimal point and the first figure!

But this is only a portion of brick's amazing economy. Its useful life goes on and on—often 35 years, sometimes 50 years or more. In recent years more improvements have been made in the manufacture and construction technique of brick pavements than in all of the centuries of its use.

Engineers can simplify their work—make startling reductions in "pavement cost per year" by resurfacing failing pavements with brick and protecting new construction with a modern brick surface.

For further information, write National Paving Brick Association, National Press Building, Washington, D. C.

BRICK

FOR NEW AND RESURFACE JOBS

port to the magnetic theory of cyclic distortion of the earth as the cause of ocean transfluxes.

A measure of success has attended the use of certain correlation formulas in long-range forecasting. I believe that where success occurs it is due to the existence of a few powerful short magnetic cycles, notably the cycles of 7/9 and 7/27 year, or 9⅓ and 3 1/9 months. French (1927), for example, has found frequent correlation between supernormal air temperature in March and subsequent supernormal winter rainfall in southern California. McEwen has found frequent correlation between supernormal ocean temperature about the first of September and subsequent subnormal winter rainfall in southern California. Both of these correlations are explained by cycles of 9⅓ and 3 1/9 months in ocean transflux and rainfall.

The ocean transflux theory serves to explain, in a simple way, both the existence of Miocene coal beds 30 ft. thick near the north pole and the Permian ice-age near the equator. As to the former Sir Archibald Geikie said: "One of the most remarkable geological discoveries of recent times has been that of Miocene plant beds in North Greenland. The stagnant waters bore water-lilies, while their banks were clothed with reeds and sedges. When we remember that this vegetation grew luxuriantly within eight degrees of the North Pole, in a region which is now in darkness for half of the year, and is almost continuously buried under snow and ice, we can realize the difficulty of the problem in the distribution of climate which these facts present to the geologist."

If coal is the carbonized remains of marine plankton that throve in warm water but died in winter, and if great transfluxes of tropical water occur at peaks of long, powerful magnetic cycles, arctic and antarctic coal beds are understandable.

Since minor cycles of ocean transfluxes certainly occur, it is probable that major transfluxes have occurred and have had precisely the same type of cause. Only a magnetic cause fits all the facts.

The well known periodic shifting of meteorological "centers of action" and "polar fronts" likewise find at least partial explanation in the ocean transflux theory. Hence it becomes very important not to confine meterological investigations to the atmosphere, but to direct attention also to changes in ocean temperatures and currents.

INTERNATIONAL EXHIBITION OF ROAD SAFETY

In connection with the XI Automobile Salon scheduled to be held in Milan from Oct. 28 to Nov. 11, 1939 an International Show of Road Safety will be organized. A series of manifestations will take place at the same time among which may be mentioned "A Practical Week of Good Circulation" and a meeting of road and traffic technicians. The Secretariat of the Committee, located in Milan, Corso del Littorio I A, will give information to those who wish to collaborate or are interested in the exhibition.

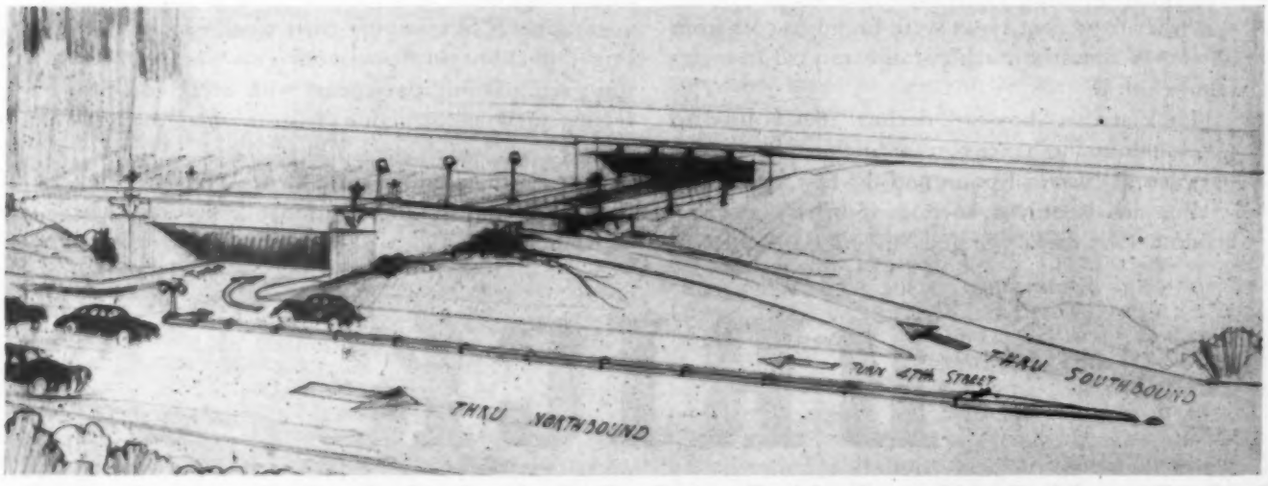
▼

SAFETY FIN AND DEATHLESS SAFETY ISLANDS

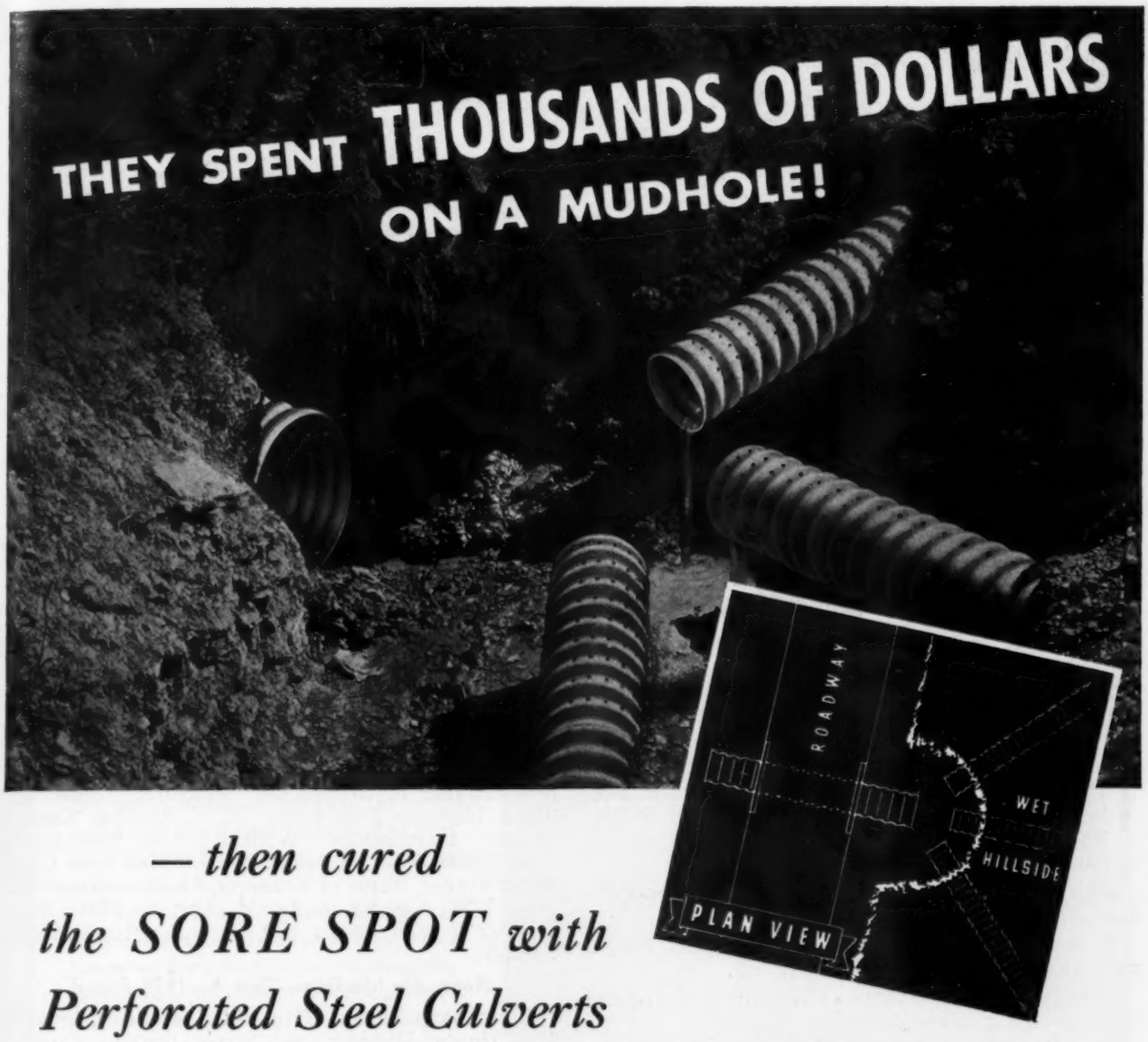
The Chicago Park District, of which Otto K. Jelinek is traffic engineer, is completing the experimental construction of a new type of divisional fin on the Outer Drive at 47th St., Chicago. It features two new types of safety islands at the north and south ends of the fin. The north island has approaches made of white concrete and is so designed that cars would be deflected from the island proper if stuck from an angle or off center, or stop the car by friction and gravity in case the island approach is straddled. The south island has approaches made of two parallel wire cables inclined from the pavement to the safety island with Federal yellow colored wood boards between these cables. Cars whose drivers are asleep or have their attention diverted would, upon driving on the device, cause the cables to sag, thereby further causing the wood boards to clack upon the pavement, which would give a sound warning to the drivers of their approaching danger.

Stretching between the above described islands and two turn-off islands at 47th St. extended are six separate strands of yielding cable, so arranged that it acts as a positive divisional fin without the dangers of fixed types of curbs used on ordinary divisional fins. Cars striking this new type of fin would be deflected back into their proper channel by the yielding cable and would not jump the curb, as is the custom on ordinary fins, which frequently cause drivers to lose control of their cars.

Experimentation of this installation has been carried on at the 23rd St. viaduct in the southbound drive. The tests were carried on to destruction. From these tests many new features have been added to this device.



Sketch Showing Installation of Safety Fin and Deathless Safety Islands



— *then cured the SORE SPOT with Perforated Steel Culverts*

THIS wet hillside was a continual source of trouble, causing a soft roadbed and intermittent slides. Thousands of dollars had been spent in repairs and maintenance work without lasting success. Then they installed three lines of U·S·S Perforated Culverts extending up the hill like a chicken foot and draining into a fourth culvert through the roadbed. This economical installation solved the drainage problem without further trouble.

Perforated culverts made of U·S·S Galvanized Copper Steel often prevent slides, sunken roadbeds, soft spots in places where seepage is difficult to control. And the cost is small compared to cost of making road repairs.

A large majority of road maintenance jobs can be traced to inadequate drainage. Many of them could be prevented if more culverts were used in the first place. The low cost of galvanized culverts of U·S·S Copper Steel makes it possible to furnish better drainage without running up the cost of the job.

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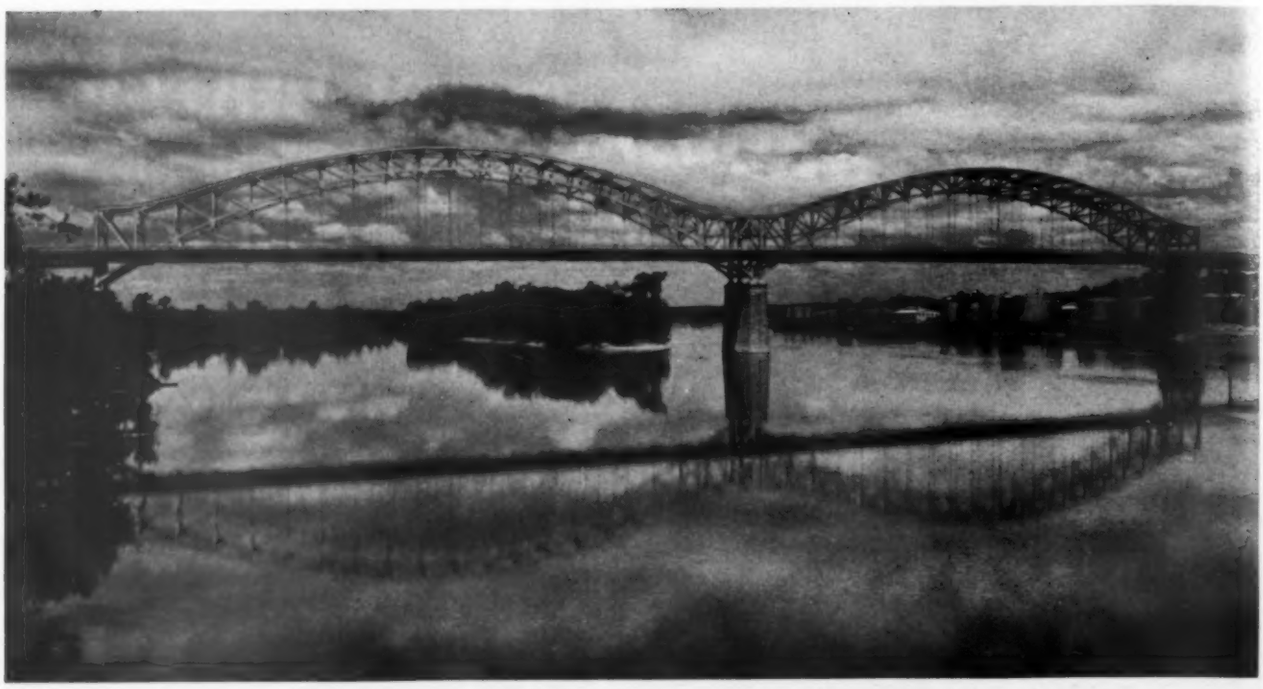
UNITED STATES STEEL



Monumental Bridge: Middletown-Portland Bridge at Middletown, Conn.

THE MOST BEAUTIFUL STEEL BRIDGES OF 1938

THE 11th annual awards for the most beautiful steel bridges built during the year were announced June 23 by the American Institute of Steel Construction as follows:

Most beautiful monumental bridge: Middletown-Portland Bridge at Middletown, Conn.

Most beautiful middle-sized bridge: Capital Bridge, across Kentucky River at Frankfort, Ky.

Most beautiful small bridge: Middle Fork of Flathead River Bridge at Belton, Mont.

Most beautiful movable bridge: Lafayette Avenue Bridge, over East Channel of Saginaw River at Bay City, Mich.

The announcement of these awards was made at a dinner extended the Jury of Award and to participants in the competition by the Institute. Only steel bridges which had been completed and opened to traffic during the calendar year 1938 were eligible to compete. The Jury making the award consisted of:

Graham Erskine, representing Arthur L. Harmon of Shreve, Lamb & Harmon, Architects; J. Andre Fouilhoux, Architect; Professor David L. Snader, Dept. of Civil Engineering, Stevens Institute of Technology; Kenneth Hayes Miller, Artist, and F. E. Schmitt, Editor, Engineering News-Record.

In addition to the four prize-winning bridges in each class, the Jury selected four other bridges for honorable mention. For the purpose of classification all bridges costing $1,000,000 or more were grouped in Class A; bridges costing less than $1,000,000 but more than $250,000 to build were grouped in Class B; bridges costing less than $250,000 were grouped in Class C, and all movable bridges were placed in a fourth class.

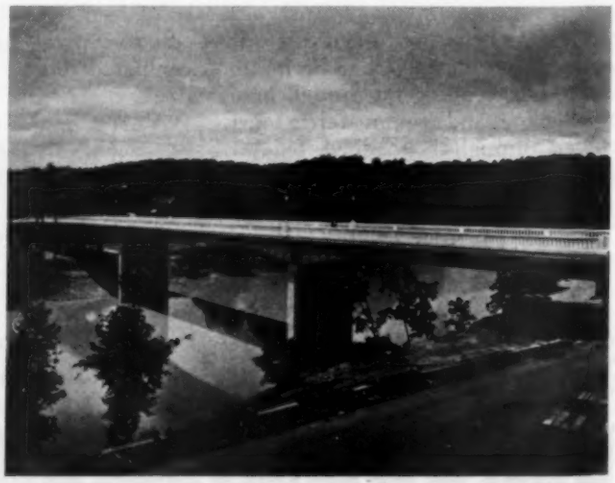
Following is a description of all the bridges selected for prize or mention:

First Place—Class A—1938 Award

MIDDLETOWN-PORTLAND BRIDGE—Middletown, Connecticut; Total Cost, $3,000,000; Engineers: Designed by William G. Grove under the direction of L. G. Sumner, Engineer of Bridges and Structures, Connecticut States Highway Department; E. C. Welden, Deputy Highway Commissioner; William J. Cox, State Highway Commissioner; Fabricators, Bethlehem Steel Company; Owner, State of Connecticut; Date Completed, July, 1938; Opened to Traffic, Aug. 6, 1938; Span lengths: 2 steel arches 600 ft. each; Total length, 3,400 ft.

Honorable Mention—Class A—1938 Award

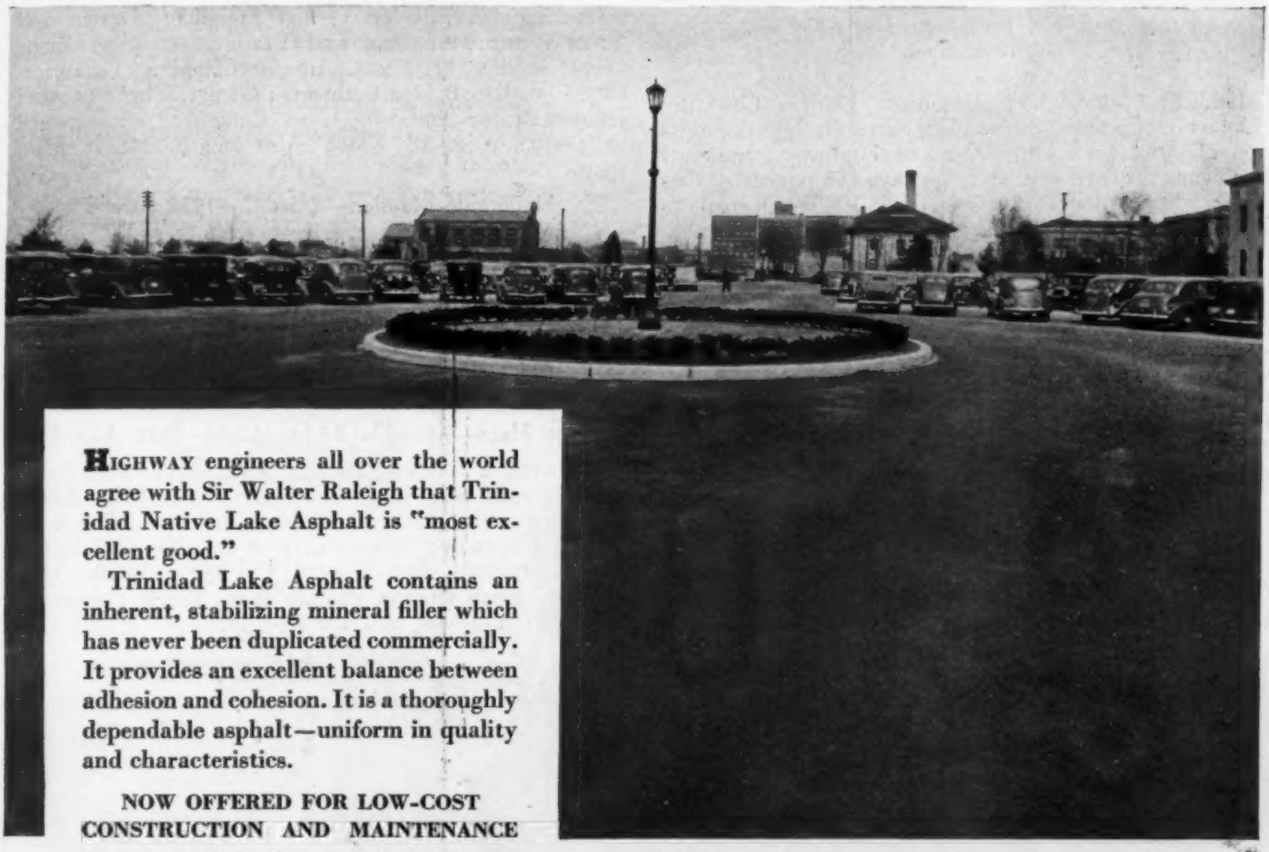
BLUEWATER BRIDGE—Over St. Clair River, between Port Huron, Michigan, and Sarnia, Ontario, Canada; Total Cost, $2,744,018; Engineers: Modjeska, Masters and Case; Canadian Associate Engineers, Monsarrat and Pratley; Fabricators, American Bridge Company (Main Bridge); Wisconsin Bridge & Iron Company



Medium-Sized Bridge: Capital Bridge at Frankfort, Ky.

"MOST EXCELLENT GOOD,"

said Sir Walter Raleigh



HIGHWAY engineers all over the world agree with Sir Walter Raleigh that Trinidad Native Lake Asphalt is "most excellent good."

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Barber Asphalt Corporation offers a complete line of Trinidad Lake Asphalts for *low-cost* highway construction and maintenance—including cold mixes. Mail coupon for full information about products you're interested in.

Nassau County Court House Circle, Mineola, N. Y., paved in 1938 with Trinidad Cold Plant Mix. Photograph taken March 24, 1939.

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TRINIDAD
NATIVE LAKE
ASPHALT

Small Bridge: Middle Fork at Flathead River Bridge at Belton, Mont.

(Michigan Approach); Hamilton Bridge Company (Ontario Approach); Owners: State Bridge Commission of Michigan; Department of Highways, State of Michigan; Department of Highways, Province of Ontario; Date Completed, Sept. 20, 1938; Opened to Traffic, Oct. 8, 1938; Span length, 871 ft. main span.

First Place—Class B—1938 Award

CAPITAL BRIDGE—Across Kentucky River at Capital Avenue, Frankfort, Kentucky; Total Cost, $329,316.39; Engineers: Bridge Department, Department of Highways of Kentucky; Fabricators and Erectors, Bethlehem Steel Company; Owner, Commonwealth of Kentucky; Date Completed, May 25, 1938; Opened to Traffic, June 4, 1938; Span lengths: 3 spans at 67 ft., one continuous span at 474 ft.

Honorable Mention—Class B—1938 Award

CHAIN BRIDGE—Over Potomac River, between District of Columbia and Virginia; Total Cost, $342,529 (superstructure); Engineers, Modjeski, Masters and Case; Fabricators, Bethlehem Steel Company; Owner: Government of the District of Columbia; Date Completed and Opened to Traffic, June 17, 1938; Span lengths: 6 at 172 ft., 2 at 160 ft.

First Place—Class C—1938 Award

MIDDLE FORK OF FLATHEAD RIVER BRIDGE—Belton, Montana; Total Cost, $74,815.25; Engineers: Montana Highway Department, B. J. Ornburn, Bridge Design Engineer; Fabricators, Pittsburgh-Des Moines Steel Company; Owner: Montana Highway Commission; Date Completed, June 10, 1938; Opened to Traffic, July 2, 1938; Span lengths: 84 ft., 168 ft., 84 ft.

Honorable Mention—Class C—1938 Award

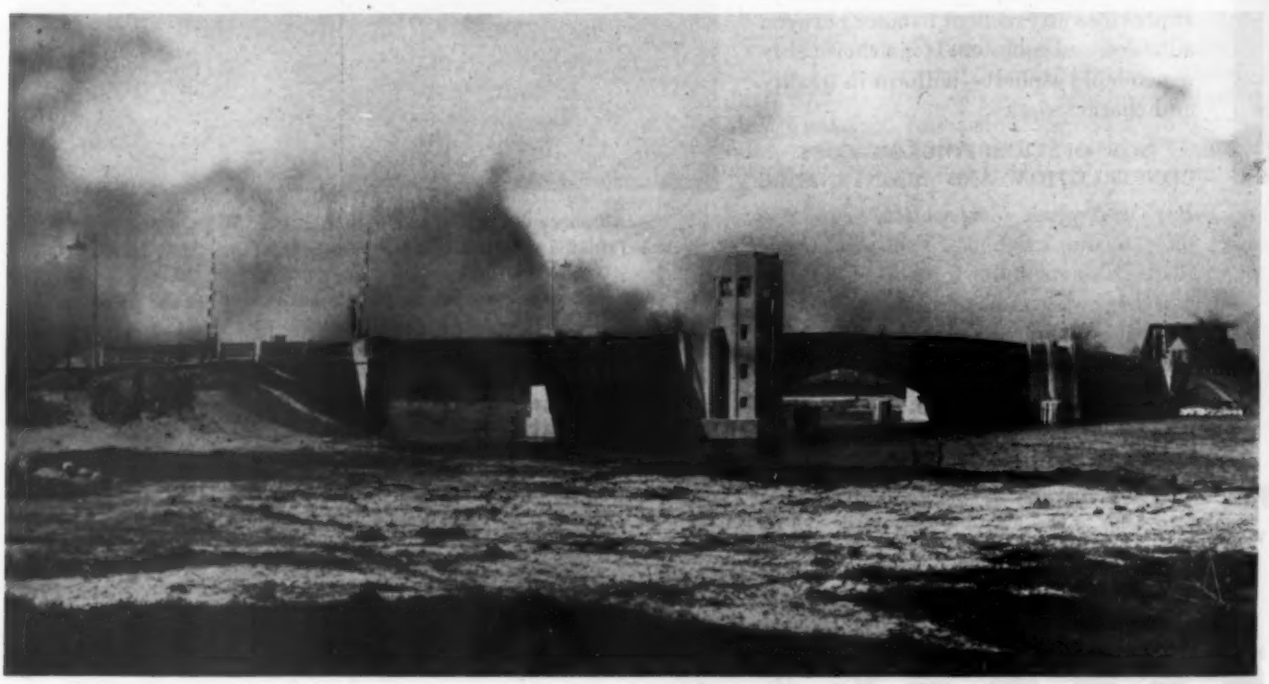
THOUSAND ISLANDS INTERNATIONAL BRIDGE—Between Constance and Georgina Islands in the Canadian Channel of the St. Lawrence River; Total Cost, $110,000; Engineers: Robinson and Steinman, Design and Supervision; Monsarrat and Pratley, Associate Engineers; William T. Field, Advisory Engineer; Fabricators, Canadian Bridge Company; Owner, The Thousand Islands Bridge Authority; Date Completed and Opened to Traffic, Aug. 18, 1938; Span length, 348 ft. main span.

Honorable Mention—Class C—1938 Award

BURNHAM PARK PEDESTRIAN BRIDGE—Foot of 47th Street, Burnham Park, Chicago, Illinois; Total Cost, $14,700; Engineers: Engineering Division, Chicago Park District; Fabricators, Duffin Iron Company; Owner: Chicago Park District; Date Completed, Sept. 6, 1938; Opened to Traffic, Sept. 17, 1938; Span length, 115 ft.

First Place—Movable Bridge Class—1938 Award

LAFAYETTE AVENUE BRIDGE, EAST CHANNEL, SAGINAW RIVER—Bay City, Michigan; Total Cost, $380,000; Engineers, Hazlet, & Erdal; Fabricators, The R. C. Mahon Company; Owner: City of Bay City, Michigan; Date Completed, Dec. 5, 1938; Opened to Traffic, Dec. 7, 1938; Span length: Bascule span, 185 ft.; approach spans, 96 ft.-10 in., and 107 ft.-8 in.



Movable Bridge: Lafayette Ave. Bridge at Bay City, Mich.

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U. S. PATENTS AND TRADEMARKS RELATING TO BITUMINOUS PAVEMENTS

By GEORGE W. ECKERT

Research Chemist,
Missouri State Highway Department,
University of Missouri, Columbia, Mo.

A CONSIDERATION of the types of bituminous pavements which are being constructed leads to the question of the modifications of these pavements which are covered by patents. The patents which have been issued during the past 17 years, the duration of patent protection, cover such factors in bituminous road construction as methods of preparing mixtures of aggregate and bitumen, types and amounts of aggregate and/or bitumen to be used, and methods of laying the bituminous paving material. Patents granted since January, 1921, are briefly described here to indicate the essential features of each patent as set forth by the U. S. Patent Office Gazette. Prior to 1921, a number of important patents on bituminous pavements were issued, but these have expired and are not included here.

A number of patents are controlled by interests selling their products under registered trademarks. These trade marks are intended to show a connection between a product and a particular manufacturer, there not necessarily being a direct connection between the patented pavement and the trademark. The trademarks listed here do not include those issued for the various types of asphaltic or other bituminous materials not specified as paving material, although the bitumen may be used for such purposes.

PATENTED BITUMINOUS PAVEMENTS

No. 1,364,620. Jan. 4, 1921—**Pavement.** J. R. Draney, Ridgewood, N. J. (assignor to Bitoslag Company).

A pavement comprising a foundation formed of a mixture of oxidized asphalt and mineral aggregate, and an adherent wearing surface applied to said foundation.

No. 1,366,711. Jan. 25, 1921—**Method of Laying Bituminous Pavement Material.** F. B. Bosch, Harrisburg, Pa.

A method of laying bituminous pavement that includes distribution of the material in directions at acute angles to the longitudinal axis of a base and then first rolling the material in a direction substantially parallel with said axis.

No. 1,390,194. Sept. 6, 1921—**Road Structure and Process of Making.** J. S. Burdge, Huntington Park, Calif.

A process which comprises the steps of applying natural bituminous sand or rock in a granular condition to a manufactured bituminous concrete pavement structure, while the latter is still hot.

No. 1,370,815. March 8, 1921.—**Pavement and Process of Making the Same.** G. A. Henderson, St. Albans, W. Va.

A paving structure comprising relatively large sizes of stone coated in the absence of dust with bitumen and then bound with a mixture of mineral particles coated with bitumen of different consistency, in the absence of dust, and then mixed with a bitumen-coated dust acting as a filler colloidally interposed in all interstitial spaces between the coated particles, and compressed into shape.

No. 1,409,104. March 7, 1922—**Pavement and Process for Making the Same.** G. A. Henderson and H. K. Stephenson, St. Albans, W. Va. (assignors to the International Bituconcrete Company).

A paving structure consisting of a broken stone base of relatively large size of stone coated with a pure bituminous binder, the interstices between which are filled with mineral and vegetable matter of smaller sizes impregnated and coated in the absence of dust with a mastic of impalpable mineral dust colloidally suspended in sulfochlorinated bitumen.

No. 1,464,488. Aug. 7, 1923—**Method for Making Bituminous Paving Mixtures.** F. S. Besson, Washington, D. C.

A method of making bituminous paving mixtures, consisting in determining the void percentage of a definite volume of a loose aggregate and the specific gravity of the aggregate, with these as factors determining from a graph the amount of bitumen required for an aggregate having similar void percentage and specific gravity and adding this amount of bitumen to the loose aggregate.

No. 1,472,393. Oct. 3, 1923—**Paving Material.** W. T. Headley, Philadelphia, Pa.

A paving material capable of manufacture without the application of heat and susceptible of bulk shipment without setting, and consisting of a mineral aggregate and an emulsion of bitumen and which contains a volatile solvent of bitumen which delays setting of the material while in bulk and until spread.

No. 1,482,960. Feb. 5, 1924—**Process of Manufacturing and Laying Bituminous Sheet Pavement.** F. C. Alsdorf, Columbus, Ohio.

This refers to agitating a heated mixture of bitumen and aggregate and while the mixture is still warm adding a hydrocarbon distillate thereto.

No. 1,519,560. Dec. 16, 1924—**Paving Composition.** C. Swan, San Francisco, California.

Aggregate is mixed with a binder mixture consisting of a solid bituminous product, diatomaceous earth and petroleum oil.

No. 1,501,373. July 15, 1924—**Pavement and Process of Constructing the Same.** F. O. Ronk, Detroit, Mich.

A pavement formed of two or more layers containing mineral and bituminous material and secured together by a bituminous elastic cement, the uppermost layer forming the wearing surface being more rigid than the layer beneath it, and the lower layer being relatively resilient to cushion shocks received by the uppermost layer.

No. 1,500,451. July 8, 1924—**Composite pavement and Method of Producing Same.** W. E. Hacker, Los Angeles, Calif.

A pavement structure composed of two dissimilar bituminous mixtures. The lower layer is a relatively stable coarse aggregate bituminous concrete, containing relatively coarse and relatively fine mineral bodies. The upper layer is a relatively fine aggregate bituminous mortar containing relatively fine mineral bodies; and the contiguous portions of the two mixtures being so bonded and blended together by compression as to produce a unitary mass.

No. 1,561,139. Nov. 10, 1925—**Road Construction.** R. W. Coburn, Weston, Mass.

A method of road construction which consists in preparing a suitable sub-grade, depositing thereon crushed stone and dry mortar, and placing bituminous material on the same before said mortar has set.

No. 1,551,065. Aug. 25, 1925—**Paving Material and Method of Making the Same.** D. V. Snowgoose, Nevada, Mo.

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of Bethlehem Road Joints

They reach the job with dowel-caps attached

BETHLEHEM Road Joints reach your job as a unit. Dowels are shop-welded and braced in perfect alignment. Slip dowel-caps are pre-attached. There is no need for bothersome assembly on the job. All that's necessary is to add the steel-capped joint filler and set the joint in the road.

They anchor solidly with less driving

Bethlehem Road Joints are anchored to the sub-grade by pins driven through the dowels. The dowels themselves carry much of the pressure of concrete, which was formerly carried by the earth alone. Result: A 10 in. x $\frac{3}{8}$ in. pin used in a Bethlehem Joint has the same holding power as a 15 in. x $\frac{1}{2}$ in. pin used in other constructions.

They won't tip over when concrete is poured

Bethlehem Road Joints have an equally strong support on both sides of the filler mat. They won't tip out of line when concrete is poured or when the finishing machine passes over the joint. They require less attention during concreting, function more smoothly in the finished road.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Preparation of a paving material which consists of pulverizing asphalt rock, heating to remove volatile oils, and mixing with hard asphalt while heated.

No. 1,525,564. Feb. 10, 1925—**Process for Making Bituminous Paving Mixtures.** T. J. Barrett, Bordentown, N. J.

Process consists of adding to a cold aggregate a liquid bituminous binder which includes an inflammable solvent, mixing the two together under confinement but with access of air, and igniting the solvent during the mixing operation, whereby the aggregate is simultaneously heated and coated with the binder.

No. 1,549,656. Aug. 11, 1925—**Paving Process.** E. D. Drummond.

Process consists in heating fine and coarse aggregate from which the road is to be formed while in its natural state to dry the material and then mixing with the material hot asphalt cement and finally adding limestone dust to toughen the mixture.

No. 1,539,763. May 26, 1925—**Method of Constructing Asphalt Pavements.** M. G. Nixon, Bridgeton, New Jersey.

A method of constructing pavements which consists in preparing a suitable foundation, coating the surface of said foundation with an aqueous emulsion of an asphaltic binder, and then superposing a layer of nonaqueous asphaltic concrete.

No. 1,531,723. March 31, 1925—**Process of Manufacturing and Laying Bituminous Sheet Pavement.** F. C. Alsdorf, Columbus, Ohio.

This process consists in heating a stone or mineral aggregate and a bituminous cementing material, combining the same while hot, cooling the mixture and mixing further while it is being cooled.

No. 1,565,258. Dec. 15, 1925—**Bituminous Composition for Paving.** G. Cobb, Baltimore, Md.

A mixture consisting of 3½ per cent to 5 per cent of bitumen and a crushed rock or mineral aggregate with following gradation:

Passing a No. 200 mesh sieve.....not over	5%
Passing a No. 10 sieve.....	5 to 15
Passing a ¼ in. screen.....	15 to 25
Passing a ½in. screen.....	20 to 35
Passing a ¾ in. screen.....	20 to 40

No. 1,576,045. March 9, 1926—**Paving Material.** F. E. Greene, Berkeley, Calif.

A process which consists in employing steam refined asphalt heated to a temperature of from 250° to 300° F., adding thereto aggregate and limestone, the latter in excess of the asphaltic constituent, and agitating and cooking the mixture at a temperature of from 300° to 600° F.

No. 1,593,669. July 27, 1926—**Paving.** L. T. Peden, Houston, Texas.

A paving formed of aggregate coated with bitumen, and a mortar, formed of a mixture of crushed rock asphalt and a solvent, within all the voids in the aggregate.

No. 1,603,192. Oct. 12, 1926—**Paving Material and Process of Making Same.** F. W. Chamberlain, Knoxville, Tenn.

Process consists of coating sand grains by heating and mixing with an asphalt of 120 to 130 penetration containing from 50 per cent to 70 per cent dust and then discharging the mix in a heated condition into cold water to cause the bitumen to harden about the sand grains.

No. 1,570,027. Jan. 19, 1926—**Paving Composition.** J. H. Amies, Philadelphia, Pa.

A process of making a bituminous paving composition consisting of subjecting one-tenth portion of the natural soil of the grade to a temperature of about 2000° F. in a blast heater, placing the balance of the natural grade soil in a mixing machine and macerating with boiling hot water then adding the foregoing heated soil to the contents of the mixer, then adding some finely granulated quicklime and finally adding a quantity of bituminous material in a highly heated state.

No. 1,611,444. Dec. 21, 1926—**Stone Asphalt Road and Method of Preparing and Laying the Same.** D. McK. Hepburn, Philadelphia, Pa. (assignor to Amiesite Asphalt Co. of America).

This process consists of adding a slowly volatile bitumen solvent to a stone aggregate, mixing this with bitumen in sufficient quantity to completely coat the stones thereof, laying the mixture on the roadbed, and compacting the said mixture.

No. 1,620,813. March 15, 1927—**Process of Making Asphaltic Road Material.** J. D. Forrester, Kansas City, Mo.

A properly graded mineral aggregate is heated and mixed with a heated asphaltic mixture. The asphaltic mixture consists of an asphaltic binder to which has been added a hydrocarbon solvent and an argillaceous filler.

No. 1,632,456. June 14, 1927—**Method of Forming Paving Compositions.** C. Swan, Long Beach, Calif.

A preheated aggregate mixture is mixed with an asphaltic-diatomaceous earth mixture at an elevated temperature.

No. 1,634,241. June 28, 1927—**Asphaltic Paving Composition.** C. N. Forrest, Rahway, N. J. (assignor to The Barber Asphalt Company).

This refers to the preparation of an asphaltic paving mixture, the asphalt cement of which has combined with it a small amount of an acetate salt fusible at the temperatures employed in the manufacture of said asphalt cement, whereby the paving mixture is toughened.

No. 1,653,395. Dec. 20, 1927—**Pavement.** J. F. Driscoll, Buffalo, N. Y.

This consists of a two layer pavement on a foundation. The lower layer, a mixture of bitumen, a fine mineral aggregate and a coarse mineral aggregate, is laid hot and light rolled while hot. The top layer, a mixture of bitumen and fine mineral aggregate, is laid hot on the lower layer while the latter is still hot. The two layers are then heavy rolled while still hot.

No. 16,799. Nov. 29, 1927—**Road Structure and Process of Making.** J. S. Burdge, Huntington Park, Calif. (assignor to Warren Brothers Company).

A natural bituminous or asphaltic sand or rock in a granular condition is applied on a manufactured bituminous or asphaltic concrete pavement while the latter is still hot.

No. 1,648,166. Nov. 8, 1927—**Process of Preparing Road-Building Material.** O. L. Dillon, Hernando, Miss.

A process of preparing mineral aggregates, containing earthy matter, for use with bituminous binders, which process consists essentially in moistening such aggregates with an alkaline solution, and then drying and heating the same before admixture with the bitumen.

No. 1,689,123. Oct. 23, 1928—**Method of Constructing Wearing Surfaces of Roads.** S. Everett Finley, Atlanta, Ga.

This process consists of covering the road structure with bitumen of suitable consistency, adding to the bitumen coating mineral aggregate, and kneading and thoroughly admixing the bitumen and aggregate.

No. 1,672,408. June 5, 1928—**Bituminous Roadway.** J. W. Frazier, San Antonio, Texas (assignor to Uvalde Rock Asphalt Company).

A process of forming bituminous road base comprising the heating of crushed rock and mineral particles, coating the same with a thin film of asphaltic oil, mixing therewith about 10 per cent of the bulk in pulverized rock asphalt, and agitating and mixing the same at a temperature of approximately 300° F.

No. 1,670,826. May 22, 1928—**Construction of Surfacings for Roadways.** A. E. Schutte, Northboro, Mass.

A method of producing a paving material which comprises first saturating vegetable fibre with a bituminous cement, then cutting the fibre into small particles and mixing it with bituminous and mineral matter.

No. 1,654,746. Jan. 3, 1928—**Pavement and Method of Manufacturing the Same.** C. A. Mullen, Montreal, Quebec, Canada.

This refers to a two layer pavement. A lower layer comprises aggregate coated with a bitumen, and has impressed upon it while sufficiently plastic a regular pattern of raised and lowered sections on which is spread the upper finer layer. The upper layer consists of previously mixed aggregate and bituminous binder.

No. 1,655,240. Jan. 3, 1928—**Road Making.** J. Radcliffe Upper Clapton, London, England.

Stone aggregate is coated with a liquid binder at a melting point lower than is necessary to resist summer heat, and subsequently before or during drying applying to the coated aggregate while cold a powdered bituminous binder.

No. 1,674,523. June 19, 1928—**Art of Road Making.** S. S. Sadtler, Montgomery County, Pa. (assignor to Amiesite Asphalt Company of America.)

Stone of an alkaline nature is coated with a bitumen liquefier such as kerosene, in which is dissolved soap containing unneutralized acid, and then incorporated with a bitumen.

No. 1,661,832. March 6, 1928—**Paving Material and Process of Making.** F. Iwanski, Berlin, Germany.

Highly siliceous granular material is steam hardened with lime and the resulting product is impregnated with bituminous substances.

No. 1,662,377. March 13, 1928—**Method for Producing Asphalt-Paving Mixtures.** J. S. Downward, Dallas, Texas.

A process which involves preparing first a mixture of mineral matter and blown asphalt of high melting point, and second, a mixture of mineral matter and asphalt of low melting point. These two materials are then mixed together while cold, and the final mixture is heated at the point of use.

No. 1,683,493. Sept. 4, 1928—**Road Composition and Method of Making Same.** S. S. Sadtler, Montgomery County, Pa. (assignor to Amiesite Asphalt Company of America).

A method of forming a road composition, which consists in taking a mineral aggregate, mixing with said aggregate a water-in-oil emulsion of a bitumen liquefier carrying a mineral filler, and thereafter coating the aggregate with bitumen.

No. 1,701,497. Feb. 12, 1929—**Paving.** R. C. Heath, Melrose, Mass. (assignor to The Barber Asphalt Co.).

This method comprises laying a Telford Stone base, wet-grouting, and then brooming said base, so as to leave the tops of its stones projecting above the grout, and laying the top directly thereon with bituminous emulsion binder.

No. 1,706,077. March 19, 1929—**Roadway and Method of Making the Same.** S. S. Sadtler, Springfield Township, Montgomery County, Pa. (assignor to Amiesite Asphalt Co. of America).

A roadway comprising a compact foundation course consisting of water repellent clayey earth having intermixed therewith a relatively small quantity of stearate of zinc and a surface course of asphaltic paving material which does not require heating to be laid.

No. 1,707,055. March 26, 1929—**Pavement.** J. F. Driscoll, Buffalo, N. Y.

A pavement constructed of three layers, each of which is layed hot and rolled while hot. The lower layer consists of a mixture of bitumen, fine mineral aggregate and coarse mineral aggregate. The intermediate layer consists also of bitumen, fine mineral aggregate, and coarse mineral aggregate, and the top layer consists of bitumen and fine mineral aggregate.

No. 1,729,573. Sept. 24, 1929—**Method of Preparing Road Surfacing Compositions.** S. E. Finley, Atlanta, Ga.

Aggregate is continuously and repeatedly lifted and tumbled above the road surface and simultaneously the aggregate is sprayed with a bituminous binding medium.

No. 1,729,884 Oct. 1, 1929—**Method of Making a Wear Course for Pavements.** L. R. MacKenzie, Des Moines, Iowa.

This method comprises superposing of one layer of asphaltic material upon another, with a semi-rigid binding mesh anchoring element placed between them, and compressing the masses and thereby forcing into and partially through the meshes of the anchoring element rock aggregate, a substantial portion of which is a maximum size greater than the thickness of either layer when the layers are finally compressed.

No. 1,717,769. June 18, 1929—**Composite Bituminous Pavement.** M. L. Gordon, Burlingame, Calif.

A method of constructing a bituminous pavement which comprises spreading a hot coarse aggregate bituminous concrete mixture, compressing it to approximately 75 per cent of the compression it will take, covering it with a hot finer aggregate bituminous concrete mixture, compressing it to 75 per cent of the compression it will take, and while this mixture is still hot covering it with a still finer aggregate bituminous mixture and compressing the complete pavement into a single layer.

No. 1,720,101. July 9, 1929—**Pavement and Method of Preparing Same.** G. M. Souter, Los Angeles, Calif.

A pavement composed of an asphalt-coated rock base, a relatively thin layer of a mixture of sand, dust and asphalt upon said base to waterproof the same, and a surface of rock coated with an asphaltic body pressed into said layer so that a substantial portion of the rock surface with interstitial spaces remains exposed above said layer to form a non-skid surface.

No. 1,707,939. April 2, 1929—**Wear Course for Pavements.** L. R. MacKenzie, Des Moines, Iowa.

A pavement comprising a course of asphaltic material, angular rock aggregate in said course of a largest dimension greater than ½ the thickness of the course, and means in the course substantially spaced from the top and bottom thereof for permitting movement of the rock vertically in the course when the course is compressed by traffic or otherwise, and for substantially preventing the movement in a horizontal direction of that portion of the aggregate adjacent to it.

No. 1,779,954. Oct. 28, 1930—**Paving Material and Method of Preparing.** E. A. Young and G. H. Alvey, San Antonio, Tex. (assignors to Uvalde Rock Asphalt Co.).

The method of making a paving composition which comprises crushing a rock asphalt, making up a mass of said crushed rock asphalt sized and proportioned to give a balanced mixture having a minimum of voids, treating said rock asphalt with a flux, and adding to said mixture a crushed rock which is harder than the rock asphalt and which is in sizes and quantity such as to create voids in the total mixture.

No. 1,764,534. June 17, 1930—**Method of Preparing Pavement Composition.** M. D. Shannon, Sacramento, Calif.

The method of preparing a pavement composition which consists in combining a mixture of asphalt, powdered limestone, and sand containing not less than 3 per cent of moisture, said materials being thereafter subjected to a temperature in excess of 375° F.

No. 1,757,661. May 6, 1930—**Asphaltic Concrete Paving.** J. W. Fraser, Cleveland, Ohio.

The method of making a paving mixture which consists in heating crushed stone to approximately 250° F. and then mixing therewith two parts of cold Kentucky sand rock asphalt and then adding to and mixing therewith one part of asphalt cement.

No. 1,749,651. March 4, 1930—**Method of Preparing Bituminous Paving Compositions.** E. C. Wallace, Newton, Mass.

The method of preparing bituminous paving composition which consists in coating well graded mineral particles from ¼ in. in size up to the desired maximum with bitumen, then adding thereto a predetermined proportion of dust free, graded material ⅛ in. and smaller in size, then adding more bitumen, and finally adding thereto a volume of mineral dust, substantially all of which passes a 50 mesh sieve and 60 per cent or more passes a 200 mesh sieve equal to ⅓ the vol. of the bituminous cement and agitating the mass.

No. 1,747,125. Feb. 11, 1930—**Road and Street Construction.** G. F. Murphy, Coral Gables, Fla.

A road construction comprising a base formed of a cold rolled layer of crushed rock, a cold rolled layer on this and formed of crushed bituminous rock, which will pass through a one inch mesh screen, and a top layer of cold rolled ground bituminous rock in which 70 per cent will pass through a ½ inch mess screen.

No. 1,778,461. Oct. 14, 1930—**Cold-Laid Paving Composition.** V. Nicholson, Chicago, Ill.

A method which comprises coating a stony aggregate with a molten hard asphalt, reducing the temperature moderately and coating the particles with a molten softer asphalt, and introducing a small percentage of a lubricant and an absorbent carrier therefor.

No. 1,779,067. Oct. 21, 1930—**Bitumen Road Paving.** D. McK. Hepburn, Philadelphia, Pa. (assignor to Amiesite Asphalt Co. of America).

A bituminous concrete is prepared by coating a mineral aggregate with a bituminous cement and then adding to the mixture clean sandy fines.

No. 1,773,788. Aug. 26, 1930—**Method of Preparing Paving Material.** W. T. Ragland, Raleigh, N. C.

Aggregate is coated with a bituminous binder in the presence of heat, and the mixture after being deposited is subjected to a fluid pressure greater than atmospheric pressure.

No. 1,769,442. July 1, 1930—**Process of Manufacturing Bituminous Road Material.** F. O. W. Loomis and D. M. Loomis, Montreal, Quebec, Canada.

Aggregate is covered with an oil, and the treated aggregate is then mixed with an asphalt emulsion.

No. 1,763,204. June 10, 1930—**Paving Mixture and Process of Preparing.** E. C. Wallace, Newton, Mass.

A paving mixture is prepared from native bituminous sands and asphalt rock by adding bituminous cement and graded aggregate to the native material to give a mixture having desired graded aggregate and consistency of bitumen.

No. 1,776,379. Sept. 23, 1930—**Cold Bituminous Paving Composition.** O. H. Berger, Birmingham, Ala.

Mineral aggregate is mixed with an asphalt cement, and the mixture is then mixed with from 3 to 5 per cent of water.

No. 1,789,447. Jan. 20, 1931. **Pavement.** O. M. Paddleford, Huntington Park, Calif.

A mixture of rocks and clay is heated and mixed with asphalt, and this is then poured on the roadway and rolled while still hot.

No. 1,793,345. Feb. 17, 1931—**Bituminous Paving Composition.** E. C. Wallace, Newton, Mass.

A heated aggregate is coated with a heated bitumen, and prior to chilling, a non-coherent, non-hygroscopic composition, comprising mineral particles coated with bitumen, is added to give a mixture which consolidates into a firmly coherent mass by application of pressure.

No. 1,827,522. Oct. 13, 1931—**Stone Asphalt Road.** D. McK. Hepburn, Philadelphia, Pa. (assignor to Amiesite Asphalt Co. of America).

Aggregate is dried by a current of air without increasing its temperature, and it is then treated with a bitumen solvent and subsequently coated with a bitumen.

No. 1,791,109. Feb. 3, 1931—**Process of Preparing Road-Building Aggregate.** L. Wittenberg, New Rochelle, N. Y. (assignor to The Barrett Co.).

Bitumen and stone are mixed while the bitumen is fluid and the stone has a temperature approximately equal to that at which the bitumen will set.

No. 1,842,139. Jan. 19, 1932—**Process of Producing Road Paving Material.** G. W. Alsdorf, Miami Beach, Fla.

Aggregate is treated with an emulsified hydrocarbon solvent and then coated with a heated bitumen.

No. 1,862,502. June 7, 1932—**Paving Mixture.** J. E. Black, Kansas City, Mo. (assignor to National Pavements, Inc.)

A relatively coarse mineral aggregate is mixed with a cutback asphaltic binder and a discrete clay material.

No. 1,884,471. Oct. 25, 1932—**Paving Aggregate.** L. Wittenberg, New Rochelle, N. Y. (assignor to The Barrett Co.)

Aggregate is coated first with a solution of cementitious tarry bitumen and then with a bitumen which is substantially solid at atmospheric temperatures.

No. 1,929,388. Oct. 3, 1933—**Manufacture of Pavements.** C. A. Mullen, Montreal, Quebec.

A paving mixture is prepared by coating aggregate in three steps. First a priming oil is added to the aggregate, then the bituminous cement, and then adding another and dissimilar volatile oil as a temporary fluxing oil. The material can be transported and laid cold.

No. 1,940,417. Dec. 19, 1933—**Bituminous Pavement.** A. S. Hirzel, Wilmington, Del.

A bituminous pavement having an upper course comprising a bituminous binder and a mineral aggregate of stone and slag, the larger particles being stone and the smaller particles the slag.

No. 1,940,645. Dec. 19, 1933—**Manufacture of Bituminous Paving Material.** R. P. Fletcher, Jr., Wilmington, Del.

A bituminous pavement is made by mixing aggregate with a fluxing oil, a bituminous cement, and a powdered asphalt in the order named. The mixture is layed before complete coalescence of the bituminous ingredients.

No. 1,946,517. Feb. 13, 1934—**Sand Rock Asphalt Pavement.** G. H. Alvey, San Antonio, Tex. (assignor to Uvalde Rock Asphalt Co.).

Pulverized rock asphalt is mixed with sand and the mixture heated to around 300° F. and an asphaltic flux added.

No. 1,964,987. July 3, 1934—**Constructing Bituminous Macadam Roads.** R. B. Harris, Jacksonville, Fla. (assignor to Wood Chemical Products Co.).

A macadam road construction comprising a base of aggregate which is predominantly alkaline, an asphaltic wearing surface and an intermediate priming layer, the latter comprising one of the group consisting of wood tar and wood tar oil.

No. 1,975,458. Oct. 2, 1934—**Manufacture of Cold Mix Paving Material.** A. S. Hirzel, Wilmington, Del.

Aggregate is coated with a volatile solvent, a road oil, and an asphaltic cement in the order named.

No. 2,012,496. Aug. 27, 1935—**Process of Preparing Paving Mixtures.** C. F. Carroll, Los Angeles, Calif. (assignor to American Bitumuls Co.).

Aggregate is dried by means of dry heat, and is then coated with bitumen, a minor portion first added as emulsion and the remainder in the form of hot molten paving asphalt.

No. 2,003,861. June 4, 1935—**Paving Material.** K. E. McConnaughay, Indianapolis, Ind. (assignor to PreCote Corp.)

An aggregate (treated with an oil, a tar distillate, an emulsifying agent, and an inert thinner) is mixed with a bituminous binder.

No. 2,003,888. June 4, 1935—**Method of Constructing Asphalt Pavement.** C. C. Jamieson, Jacksonville, Fla.

Aggregate in the roadbed is mechanically mixed with blends of binder and flux oil in a plurality of applications.

No. 1,999,178. April 30, 1935—**Cold Mix and Cold Laid Bituminous Pavement.** C. M. Baskin, Montreal, Quebec.

Mineral aggregate is coated with a priming oil, mixed with a powdered asphalt, and then treated with a second portion of priming oil.

No. 2,023,068. Dec. 3, 1935—**Bituminous Paving Mixture.** W. H. Flood, Chicago, Ill.

A mineral aggregate is coated with a bituminous material, and powdered aluminum stearite is added to the mixture.

No. 2,013,972. Sept. 10, 1935—**Bituminous Paving Material.** S. S. Sadtler, Springfield Township, Montgomery Co., and Woolsey H. Field, Wyncote, Pa.

A wet mineral road aggregate is agitated with an emulsion until each piece of aggregate is completely coated.

No. 2,025,945. Dec. 31, 1935—**Paving Mixture.** C. N. Forrest, Cranford, N. J. (assignor to The Barber Asphalt Co.)

An aggregate of natural bituminous rock is mixed with an aqueous emulsion of a bitumen and then admixed with a powdered hard bitumen.

No. 2,026,614. Jan. 7, 1936—**Paving Commission and Process of Producing.** J. H. Conzelman, Birmingham, Ala. (assignor to Alabama Asphaltic Limestone Company).

A process of making paving mixtures which comprises adding to crushed rock asphalt a volatile solvent for bitumen in an amount merely sufficient to soften the hard native asphalt in the rock asphalt with the asphalt in the bonding medium, adding an aqueous asphalt emulsion and agitating until a homogeneous mixture results.

No. 2,049,772. Aug. 4, 1936—**Method of Making Bituminous Paving Materials.** D. McK. Hepburn, Philadelphia, and S. S. Sadtler, Springfield Township, Montgomery County, Pa. (assignors to Hepburnite Corporation).

A method for making paving mixtures which comprises agitating a mineral aggregate with a high-penetration bituminous cement admixed with a slowly volatile solvent and a small quantity of fatty acid partly neutralized with an alkali, and then adding with further agitation a small quantity of a powdered bitumen.

No. 2,049,985. Aug. 4, 1936—**Method of Preparing a Paving Composition.** B. H. Wait, New Rochelle, N. Y., and R. T. Haller, Plainfield, N. J.

A portion of a mineral aggregate is heated and coated with a hot bituminous cement. This is mixed with clean, uncoated, cold aggregate, after which a fluxing oil and powdered asphalt are added.

No. 2,051,577. Aug. 18, 1936—**Pavement Compositions and Method of Making.** W. L. Schloss, Cleveland Heights, Ohio.

A paving composition comprising broken rock including pieces of various sizezs 50 to 80 per cent, a liquefier coating the rock pieces .5 to 1.0 per cent, asphalt cement 4½ to 7 per cent and a sufficient amount of finely divided ore containing iron oxide to supply from 3 to 5 per cent iron oxide to the mixture.

No. 2,051,731. Aug. 18, 1936—**Process for Preparing Paving Material.** K. E. McConnaughay, Indianapolis, Ind. (assignor to PreCote Corp.).

Aggregate is mixed with a bituminous liquid less than the amount the finished composition is to contain. This is then immersed in a bath of liquefied bitumen of different characteristics from the first bitumen, the aggregate afterwards elevated and excess bitumen permitted to drain from it.

No. 2,062,348. Dec. 1, 1936—**Bituminous Pavement.** C. M. Baskin, Montreal, Quebec, Canada (assignor to Standard Oil Development Co.)

A mineral aggregate is mixed with a predetermined amount of a priming oil containing a wetting agent and then mixed with a predetermined amount of powdered asphalt without the addition of heat.

No. 2,040,481. May 12, 1936—**Bituminous Paving Composition.** R. M. Grower, Arlington, Mass. (assignor to S. J. Tomasello).

80 TIMES AROUND THE WORLD

Below you see four Ford units with a combined mileage of more than 2,000,000 miles—about 80 times the distance around the world.

1936 112-inch Ford V-8 Panel, purchased in November, 1935, by Joy V. Thrash of Emporia, Kansas. Mileage now exceeds 508,000.

1935 131½-inch Ford V-8 Dump Truck with special body and trailing axle, owned by S. H. Bacon Co. of Los Angeles, California. More than 400,000 miles.

1934 Ford V-8 Tractor owned by C. E. Rimmer of Lodi, California. This truck is on the job 20 hours a day and has run over 600,000 miles.

1934 131½-inch Ford V-8 Tractor owned by Petroleum Carrier Corporation of Jacksonville, Florida. 626,000 miles and still going strong.

HERE is proof of spectacular truck performance. Not many trucks could do what these have done. Yet few Ford Truck owners will be surprised—even at this astonishing record. The man who owns or drives a Ford knows, better than any one, that for stamina and dependability it stands alone.

The units you see here, like all Ford Trucks and Commercial Cars, were built to the highest standards of quality in design, materials and workmanship. That, with the Ford Engine and Parts Exchange Plan, is the reason they were able to achieve their remarkable service record.

1939 Ford Trucks and Commercial Cars are better built than ever to give reliable, low-cost service over thousands of miles in every hauling and delivery field. There are 3 V-8 engines, 6 wheelbases, 42 body and chassis types (including cab-over-engine models) to choose from. See any Ford dealer for an "on-the-job" test.

Ford Motor Company, builders of Ford V-8 and Mercury Cars, Ford Trucks, Commercial Cars, Station Wagons and Transit Buses.

FORD V-8 TRUCKS AND COMMERCIAL CARS

A bituminous paving composition comprising a base of coarse aggregate particles, and coated successively with a layer of bituminous cementing material, a layer of fine aggregate particles and a surface layer of asphalt emulsion.

No. 2,074,010. March 16, 1937—**Bituminous Pavements of High Structural Strength.** C. M. Baskin, Montreal, Quebec, Canada (assignor to Standard Oil Development Co.).

Low penetration asphalt is mixed with a mineral dust (passing a 200 mesh screen) and an aggregate (less than ¼ inch). A mineral aggregate of 1½ to 2½ inch maximum size is added to this mixture by mixing at an elevated temperature.

No. 2,083,900. June 15, 1937—**Pavement and Method of Making Pavements.** A. R. Ebberts and E. Johnstone, New York, N. Y. (assignors to Colprovia Roads, Inc.).

A pavement comprising a plurality of courses containing aggregate and bituminous binder, the binders for the aggregates in different courses having substantially different penetrations and a subcourse containing a binder which has a substantially greater penetration than the binder for the surface course.

No. 2,082,259. June 1, 1937—**Cold-Lay Pavement.** L. T. Peden, Houston, Texas.

A pavement is made by compression of material made up of a plurality of particles, each particle being composed of a plurality of grains of aggregate cohered together by a cementious material and a flux coating.

No. 2,101,388. Dec. 7, 1937—**Process of Constructing Pavements.** S. E. Finley, Atlanta, Ga.

A layer of aggregate on the roadbed is given two applications of bituminous material and the thus coated aggregate is subjected to pressure.

No. 2,104,410. Jan. 4, 1938—**Hot Mix Cold Laid Bituminous Pavements.** C. M. Baskin, Toronto, Ontario.

Preheated aggregate is mixed at an elevated temperature with a priming oil and powdered hard asphalt.

No. 2,128,291. Aug. 30, 1938—**Art of Paving.** S. E. Finley, Atlanta, Ga.

A graded aggregate is mixed with a predetermined percentage of bitumen and is then incorporated with rock asphalt and finally further bitumen.

No. 2,110,892. March 15, 1938—**Bituminous Paving Material.** S. S. Sadtler and W. H. Field.

A paving material consisting of graded pieces of aggregate coated with a thin bituminous film, the bitumen of which contains a small quantity of water insoluble metallic salt of an organic acid.

TRADE-MARKS

(1920)

Simasco—Simpson Bros. Corporation, Boston, Mass. Bituminous Pavement.

Warrenite-Bitulithic—Warren Brothers Company, Boston, Mass. Pavement and Paving Materials Containing Bituminous Matter.

(1921)

Bitocement—Bitoslag Paving Company, New York, N. Y. Bituminous and Cementitious Paving Material.

Hassam Bi-co-mac—Hassam Paving Company, Worcester, Mass. Street-Pavements and Bituminous Paving Materials.

(1922)

Portasphalt, Asbestophalt, Asbestos-Bitulithic—Warren Brothers Company, Boston, Mass. Pavement and Paving Materials containing Bituminous Matter.

Kolmend—The United States Asphalt Refining Company, New York, N. Y. Paving Materials of Asphalt.

(1923)

Trinidad Lake Asphalt—The Barber Asphalt Paving Company, Philadelphia, Pa. For Asphalt, Crude and Refined, and Paving Materials Containing Asphalt.

(1924)

Twinplex—Calvert B. Filbert, New Orleans, La. For Paving Material Containing Bituminous Matter.

(1925)

National-Pavement-Corporation—National Pavements Corporation, New York, N. Y. Laid Pavements and Paving Blocks.

Sha-ro-as-fo-lite—Brown & Wolary, Centerville, Iowa. Composition for Making Hard Road Pavement.

Surfacrete—The United States Asphalt Refining Company, New York, N. Y. Paving Materials of Asphalt.

(1926)

ColRock—Colbert Limerock Asphalt Company, Sheffield, Alabama. For Paving Material, and More Particularly Bituminous Limerock Asphalt.

Buckite—William S. Buckland, Swedeland, Pa. Bituminous Paving Material, namely, a Product of Slag and Asphalt.

(1927)

Reef Rock—Gulf Crushing Company, Inc., Morgan City and New Orleans, La. For Asphalt Paving Material.

Valdilithic—Uvalde Paving Company, Dallas, Texas. For Pavements and Paving Materials.

Westphalt—West Process Pavement Company, Inc. Louisville, Ky. For Asphaltic Paving Material.

Macurban—Amiesite Asphalt Limited, Montreal, Quebec, Can. Bituminous Macadam Pavement.

Bit-u-mac—The Barber Asphalt Paving Company, Philadelphia, Pa. For Bituminous Concrete Pavement.

(1928)

Col-crete—The Bituminous Construction Company, Cleveland, Ohio. Asphalt Paving.

The Craig Way—Jay W. Craig, Minneapolis, Minn. For Asphaltic Surfacing Material.

Tarvia-lithic—The Barrett Company, New York, N. Y. Road-Building Materials, namely Bitumen-Coated Stone.

Sarcolithic—Asphalt Products Company, Chicago, Illinois. Mineral Rubber Pavement.

(1929)

Nurock—Neuberger Chemical Corporation, Wilmington, Del., and Irvington, N. J. For Bitulithic Paving Material.

Kolay—William B. Catchings, Raleigh, N. C. For Bituminous Compositions for Roadways.

Shell Rock, Shell Asphalt—Gulf Crushing Company, Inc., Morgan City, La. For Asphalt Paving Material.

Tarmac—American Tar Products Company, Pittsburgh, Pa. For Bituminous Tar Paving Material.

Pavrite—Hiram M. Stafford, Chicago, Ill. For Asphalt Road Material.

(1930)

Irga—Geigy Company, Inc., New York, N. Y. For Mixtures of Tar, Asphalt, Pitch, Gravel and Broken Stone for the Construction, Treatment, and Building of Roads.

Warcolite—Warren Brothers Company, Cambridge, Mass. For Paving Materials containing Bituminous Matter.

Stonhard Surbond—Benjamin Bierman, doing business as Stonhard Company, Philadelphia, Pa. For Asphalt Coated Stone Used for Construction, Repairing, and Resurfacing Roadways.

Amatite, Amatol—Amiesite Asphalt Company of America, Camden, N. J., and Philadelphia, Pa. For Paving Material comprising a Mineral Aggregate Intimately Mixed with a Bituminous Binder.

Barber Hot Mixed Macadam—The Federal Asphalt Paving Company, Hamilton, Ohio. For Road Paving Material consisting of Sand, Stone, and Asphalt.

Duraco—Uvalde Rock Asphalt Company, San Antonio, Texas. For Natural Rock-Asphalt Paving Preparation.

Colprovia—Colprovia Roads, Inc., New York, N. Y. For Paving Aggregate Coated with Bitumen.

(1931)

Worthite—Worthite Process Company, Fort Worth, Texas. For Road Surfacing and Conditioning Materials.

Granac—Lyman-Richey Sand and Gravel Co., Omaha, Nebr. For Paving Material Containing Sand, Gravel, and Asphaltic Oil.

Trinilite—John W. Spry, Dallas, Texas. For Asphalt, Brick, and Concrete Paving Material.

Interaco—The Interstate Amiesite Co., Wilmington, Del. For Materials Used in Paving and Construction Work, particularly a Cold-Mix, Cold-Lay Asphaltic Concrete for Paving Purposes.

(1932)

Mat-ite—Nolan Brothers, Minneapolis, Minn. or Bituminous Products, namely, Road Finishing and Paving Materials.

Bimastite—The Interstate Amiesite Co., Inc., Wilmington, Del. For Bituminous Paving and Bituminous Paving Materials.

"Job Test" Evidence Proves A-W Scraper Superiority

"The Answer to a Road Constructor's Dream"

. . . Says J. P. McKee, Commissioner of District No. 2, Leroy, Ala. He adds: "Since purchasing the A-W 5-yard Scraper I have found that I have been able to move more yards of dirt per day than by any other method . . . with a lowering of operating expenses. These operating figures prove it:

Average length of haul—1 way . . . . . *feet*	500
Number of hours operated each day . . . . . *hours*	8
Number of trips per day . . .	80
Times per trip . . . . *minutes*	6
Total cubic yards per day . . .	400
Kind of tractor used for power	T-40
Amount of fuel used per day . . . . . *gallons*	15
Cost of fuel per gallon . *cents*	8½
Repair and maintenance cost per month	*none thus far*

● Accurate records of scraper performance in all parts of the country pile up evidence that A-W 5, 6 and 8-yard Tractor Scrapers load more dirt per tractor horsepower . . . dump and spread with greater speed and accuracy . . . than any other scraper of the same capacity. Bit can be raised or lowered with trigger-quick accuracy. Pan fills rapidly and cutting edge is always steady because rear wheels track *inside* of bit on smoother ground. Side sway on slopes or rough terrain is minimized and draft lightened because weight is distributed over six tires. Time is saved by the ability of these scrapers to handle capacity loads in rough going . . . to dump near the edge of a sharp drop without stopping or backing up. Write for complete details and performance records on your type of work and soil. The Austin-Western Road Machinery Company, Aurora, Illinois.

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Elevating Graders

5-Yard Tractor-Scraper
6-Yard Tractor-Scraper
8-Yard Tractor-Scraper
12-Yard Hydraulic Scraper

Saturmix—Blacktop Equipment Corporation, Johnstown, Pa. For Aggregate, such as Crushed Stone, Slag, or other Aggregated Coated with Tar, Asphalt, or other Binder, to be used for Road Building purposes.

(1933)

Interstate Rock Asphalt—The Interstate Amiesite Co., Inc., Wilmington, Del. For Paving Materials.

Tarode—Reilly Tar & Chemical Corporation, Indianapolis, Ind. For Bituminous Road Surfacing Materials.

(1934)

Crown Rock Paving—The Crown Rock Company, Cincinnati, Ohio. For Asphalt Paving Material.

Oreite—The Cleveland Trinidad Paving Co., Cleveland, Ohio. For Paving Compositions, comprising Broken Rock, Ground Iron Ore, and an Asphaltic Binder.

Amulithic—L. R. MacKenzie Incorporated, Tulsa, Okla. For Pavement Materials.

(1935)

Roadamite—John R. Ott Contracting Company, Los Angeles, Calif. For Asphalt-Cement Paving Material.

Grasstex—American Bitumuls Company, Wilmington, Del., and San Francisco, Calif. For Asphaltic Compositions, Pavement Materials.

(1936)

Skidno—Roxanda Mines, Inc., St. Paul, Minn. For Asphaltic Paving Material.

Tomasphalt—Samuel J. Tomasello, Boston, Mass. For Bituminous Paving Material.

Kern-o-mix—Elizabeth G. Kernan, South Orange, N. J. For Road Patching and Paving Material.

Trinidasco—The Barber Asphalt Company, Philadelphia, Pa. For Bituminous Paving Mixture, and for Aggregates, Fillers, Bitumen, and Materials thereof.

(1937)

Pliastone—Andresen Corporation, Chicago, Ill. For Bituminous Road Construction Material.

Tuffalt—Andresen Corporation, Chicago, Ill. For Paving Materials.

(1938)

Bitu-Rock—Bitu-Rock Corporation, Merchantville, N. J. For Bituminous Road-Surfacing Materials.

Resinicote—The General Crushed Stone Company, Easton. Pa. For Bituminous Paving Materials.

Roadcrete—Roadcrete, Inc., Newton, Ohio. For Road Surfacing Material consisting of a graded aggregate, a binder, and a moisture retentive chemical.

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MONTANA NATIONAL BITUMINOUS CONFERENCE TO BE HELD AT SUN VALLEY, IDAHO

The program for the 1939 Montana National Bituminous Conference, which will be held Sept. 11-14 inclusive at Sun Valley, Idaho, has been divided into four main sections: Research as Related to Bituminous Construction and Maintenance; Fundamentals of Bituminous Construction; Design and Construction of Bituminous Surfaces; and Maintenance of Bituminous Surfaces. At the conclusion of the presentation of papers and the discussion on these sections, a Round Table Discussion will be held where the previous discussions may be correlated and where final decisions may be reached on problems which may not have been previously discussed.

A new theme will be introduced at this year's meeting which should prove of great interest and value to highway engineers and asphalt technologists. Outstanding leaders in the field of bituminous highway surface construction and design will discuss "The Bituminous Highway Surface of Tomorrow," looking into the future and outlining trends and changes which may develop, and suggesting methods and means of long-range planning whereby the work today may be better directed toward its fitting into the designs of tomorrow and meeting the requirements for surfaces which the highways of ten to fifteen years hence will demand.

Another new subject which will also be added to the Conference program will be "National Highway Safety." Nationally known authorities will present papers in this subject and on "The Importance of the Design, Construction and Maintenance of Bituminous Surfaces to National Highway Safety."

In addition to the discussion periods on the four main Conference sections, time on the program will be allotted to discussions of "The Bituminous Highway Surface of Tomorrow," and to "The Importance of the Design, Construction and Maintenance of Bituminous Surfaces to National Highway Safety."

Sun Valley is one of America's newest and finest year-round pleasure and recreational resorts. Located in central Idaho in the famous Sawtooth Mountain Range, it is easily accessible, being served by the Union Pacific Ry. and one of Idaho's modern bituminous paved highways, U. S. No. 93.

D. A. McKinnon, State Highway Engineer of Montana, Helena, Mont., is general chairman of the Conference.

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MARKING "NO PASSING" ZONES ON MINNESOTA HIGHWAYS

The method of marking "no passing" zones by a white line placed alongside the normal center line is now being used by the Minnesota state highway department on its trunk highway system. The white line is placed at such places on highways as curves and hillcrests, where overtaking and passing another vehicle cannot be permitted because of the hazard. When the white line is on the driver's side of the center line, the motorist is not permitted to cross that line. However, if the white line is on the opposite or left-hand side of the center line and the road is clear and visible for a sufficient distance ahead, the center line may be crossed in overtaking a vehicle ahead. The white lines are 4 in. wide, the same width as the continuous center line mark, and are placed 6 in. from the center stripe.

▼

DETAILED COUNTY MAPS IN PREPARATION

Detailed county maps, showing all highways and much other information, are being prepared for all counties in the United States except those in New York and Delaware. For most of the counties no up-to-date, detailed map has ever been available. These maps are one of the products of the highway planning surveys that will have a wide public and business use in addition to use in highway planning. The surveys are being conducted by the U. S. Bureau of Public Roads in cooperation with 46 state highway departments.

The maps are being drawn in the respective state highway planning survey offices. In a number of states certain of the map series are available to the public at a price that is approximately the cost of printing and mailing. Other states have not yet made arrangements for public distribution. All inquiries should be addressed to the appropriate state highway departments.

▼

THE TEXAS STATE HIGHWAY DEPARTMENT has recently authorized an expenditure to provide individual memberships in the American Road Builders' Association for their 25 district engineers.

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HIGHWAYS AND HORIZONS DEPICTS DESIRABLE HIGHWAY SYSTEM FOR 1960

VISITORS to "Highways and Horizons," the General Motors exhibit at the New York World's Fair, will see Mr. Norman Bel Geddes' concept of how he believes the highways of 1960 should be designed. The visitors transcend time and space as they tour in moving sound chairs a vast, scale-model highway system of the future. Concluding a five year study of American highways and traffic conditions, Mr. Geddes designed the huge "Futurama" to conform with the plans he developed for a national system of high-speed motorways for servicing traffic twenty years hence.

On April 27th, President Roosevelt submitted to Congress the Bureau of Public Roads' report deprecating the need of toll super-highways, but providing for a regional system of an interconnecting, modernized network of roads. Mr. Geddes' study, while taking into consideration the necessity of immediately relieving the severely congested area, goes a step further than that, since it is based on the anticipated traffic flow of the nation.

Model Crossing Point of Two 1960 *Double-Directional Express Motorways in Highways and Horizons Exhibit.*

Shown in an accompanying picture, in the foreground of one section of the spectacular "futurama" viewed on the tour, is the crossing point of two 1960 double-directional express motorway routes. Traffic may move easily and safely without loss of speeds. By means of the ramped loops cars may make right and left turns at rates of speed up to fifty miles an hour. The turning off lanes are elevated and depressed. This motorway intersection is typical of the thousand or more innovations designed by Mr. Geddes for the magic 35,738 square-foot "futurama," which extends for a third of a mile on several levels of the General Motors exhibit building. Note the great city in the background.

The Geddes plan calls for a comprehensive national system of motorways connecting the vital parts of the nation; the exact number and location of these roads, proposes Mr. Geddes, should be determined by a national planning board. Specifications in the Geddes plan include, among other features, the complete segregation of all traffic into individual lanes. This lane segregation is designed to prevent weaving from one lane to another and offers protection from unforeseen emergencies, such as blow-outs. Since it is the intention to operate each group of lanes at a specified maximum-minimum speed, with the cars consequently traveling at identical prescribed speeds per lane, it would be impossible for one car to overtake another; rear end collisions would be eliminated; the road hog would be extinct. It would be impossible for a drunk or sleeping driver's car to leave the road. The three maximum-minimum speeds recommended are 50, 75, and 100 miles per hour.

The plan has developed conclusions, recommendations and resulting designs for all phases of highway engineering, and have applied these principles in the study of rural highway development and its relation to city traffic.

Novel Suspension Bridge Design in General Motors "Futurama."

Out of their findings have come ideas, some of them subject to further study:

1. Complete separation of all traffic streams flowing in opposite directions.
2. A complete separation of vehicular traffic from pedestrian traffic.
3. The segregation of individual traffic lanes by physical barriers.
4. Sharp distinction between all Through Traffic and Manoeuvering Traffic with automatically safe means for entering or leaving highways.
5. Highways capable of carrying automobiles traveling at three separate and constant speeds of 50, 75, and 100 miles per hour.
6. The elimination at bridges and intersections and other bottlenecks of all obstacles to the smooth flow of traffic.

There is nothing morally wrong in an automobile being able to travel at the rate of 75 miles an hour. As a matter of fact, roads can be designed and built that will

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with resilient, skidproof, economical Asphalt

This 4.5 mile Kane County, Ill., highway is being carpeted with an Intermediate Type TEXACO Asphalt surface. In every way, such a surface is right for thousands of miles of state and county roads.

Cost per mile is low, because the ingredients of the surface are Medium-curing TEXACO Cutback Asphalt and local aggregate.

The dense, tough, resilient qualities possessed by the 2½-inch carpet make it more than a match for the traffic served by the average highway.

Its skidproof texture insures safe driving at all times.

Highway officials who want the largest mileage of *adequately improved roads* their money can buy should study the Intermediate TEXACO Asphalt types. One of our experienced field men can supply you with complete, helpful information. Why not send for him?

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permit automobiles to be driven over them safely at a speed of 100 miles an hour.

Says Mr. Geddes, "The millions of square miles that make up this country's land, all of its industries, its intelligence, its social development, are all dependent completely on the flow of its traffic—the life-blood of the nation. Low grade raw materials cannot reach large industrial centers, due to long railroad hauls. With a properly planned highway system, such raw materials could be brought to local industries where they could be used economically."

"No national problem, whether it be natural resource conservation, war, education, or unemployment, can be intelligently discussed without considering the problem of traffic flow and transportation. Road building must be viewed in an entirely different light than it has been to date. It must be considered as something much more than simply the way people get from one place to another."

"Highways and the way they can be used, and the purposes to which they can be put, which involves the places where they shall be located, must be considered as an essential part of the entire economic system of the country. Any national system of transportation planned today, therefore, must be based on that fundamental principle and must recognize the economic and sociological phases of highway planning and building."

HOWARD S. REED RESUMES GENERAL ENGINEERING PRACTICE—Howard S. Reed, formerly state highway engineer of Arizona, and Sheldon Baker have returned to the general practice of engineering, with offices in the Heard Building, Phoenix, Ariz. They will specialize in municipal work, hydraulics, irrigation, planning and appraisal. Their practice was suspended during the service of Mr. Baker with the National Resources Committee and of Mr. Reed as State Director, Public Works Administration, and as state highway engineer.

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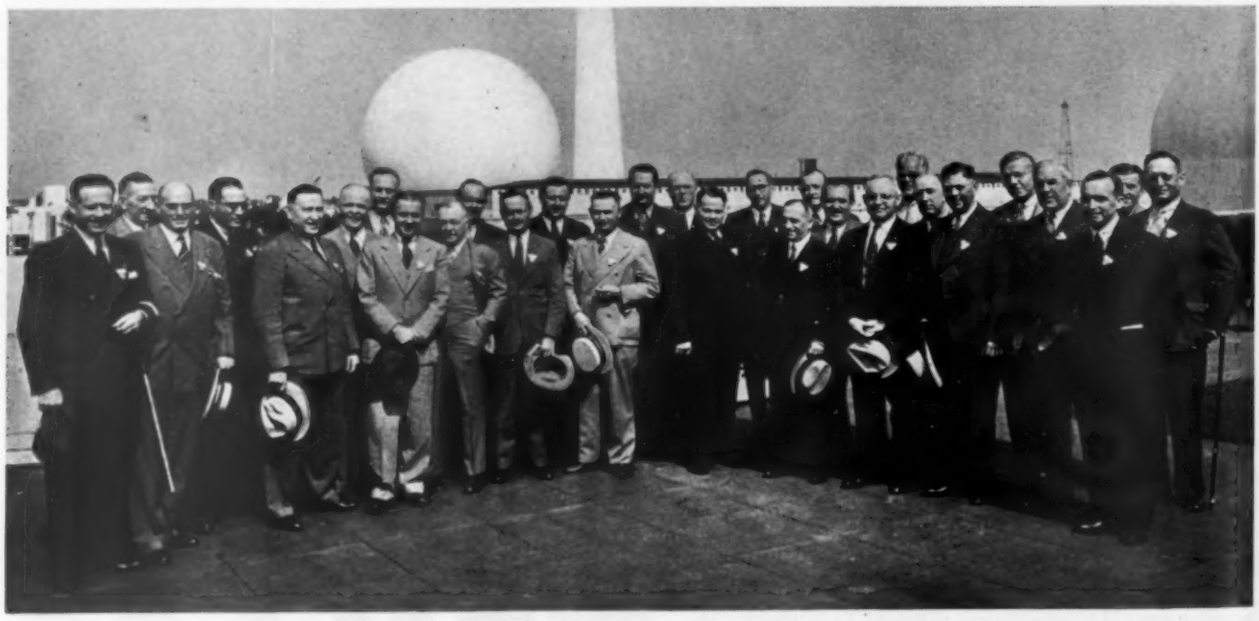
PUBLIC RELATIONS PROGRAM FOR ILLINOIS ROAD BUILDERS' ASSOCIATION—The Illinois Road Builders' Association has retained Theodore R. Sills & Co., public relations counsel of Chicago, to shape a public relations program for the Association for the coming year. Discouragement of the state's gasoline tax diversion policy will be one of the major objectives of the campaign.

▼

A.R.B.A. ROAD SHOW TO BE HELD IN CHICAGO.—The Joint Exhibit Committee of the American Road Builders' Association met in Chicago on June 27th and decided upon the 1940 Road Show. It will be held in the International Amphitheater in Chicago the week of Jan. 29th, 1940.

ROAD BUILDERS INSPECT 'HIGHWAYS AND HORIZONS'



Following a tour of inspection of the General Motors exhibit at the New York World's Fair, the above group of active members and directors of the American Road Builders Association smiled at the photog's pretty birdie. The group was the guests of Wm. P. McDonald, contractor of Flushing, L. I., N. Y., for a day at the Fair and the week-end at his Long Island lodge. Front row, reading left to right:

G. C. Stanley, City Engineer, Burlington, Vt.; Robert B. Brooks, State Highway Commissioner of Missouri; Charles M. Upham, Engineer-Director, American Road Builders' Association; Howard Hall, Iowa Manufacturing Company; Joseph Helm, Standard Oil Company of New Jersey; B. C. Heacock, Caterpillar Tractor Company; Vic Brown, ROADS AND STREETS; William M. Parrish, International Harvester Company, and President of the Manufacturers' Division, A.R.B.A.; J. E. Pennybacker, The Asphalt Institute; T. H. Cutler, State Highway Engineer, Kentucky; Carl O. Wold, Caterpillar Tractor Company; J. F. Cast, Firestone Tire and Rubber Company; E. H. Buttenheim, American City.

Back row, reading from left to right: Frederick Hoitt, New England Road Builders' Association; L. Quevas; Paul B. Reinhold, Reinhold Sand and Gravel Company, Pittsburgh; E. W. Moeller, Highway Institute, Inc., Minnesota; William C. Slee, American Road Builders' Association; W. E. Miles, Cleveland Tractor Company; Herbert R. Anderson, Anderson Construction Company, Chicago; Paul Griffiths, Koppers Company; Chester Lehman, Blaw-Knox Company; William P. McDonald, McDonald Construction Company, Flushing, L. I., N. Y.; Sam Beatty, Austin-Western Road Machinery Company; Otto Hess, Engineer-Manager, Kent County Road Commission, Michigan; Lion Gardiner, Jaeger Machine Company; A. Von der Lin, McDonald Construction Company; George Schesinger, National Paving Brick Association.

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Starting out to fill a need that is not met by any other single volume, the authors have assembled definitions of technical terms from a number of fields, including highway engineering, surveying, geology, water supply, sanitary engineering, structural engineering, architecture, engineering economics and others. At 20 definitions to a page, there must be nearly 5,000 altogether. Geological terms are especially well represented. Appendices include English-Spanish and Spanish-English highway vocabularies and a German-English dictionary for mineral ag-

...ce, $4.00.

Engineering Terminology, by *Victor J. Brown* and *Delmar G. Runner.* This book of definitions of technical words and phrases is one which every engineer needs. The ground covered by engineering has long been too large for any individual to grasp. Every engineer therefore finds himself occasionally confronted by a term which is in use in one part of the field but which conveys no exact meaning to his mind. This book gives him the answer. It is even more valuable to the layman who tries to read an engineering article understandingly than it is to the engineer. *Gillette Publishing Company.* Price, $3.50.

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Various branches of applied engineering, all of which spring from the common root of natural and physical science, have found it expedient to develop a specialized vocabulary. A word or phrase in one branch may have an entirely different meaning in another and neither may bear any marked relation to the etymological derivation. As a step toward avoiding misunderstanding and difficulty from this source for purposes of contracts, correspondence, agreements, price lists, specifications, etc., between different branches, the general public and other professions, the authors have collected 237 pages of concise definitions arranged in dictionary form. Terms from highway, geological, hydraulic and related branches of civil engineering are predominate but in spite of this the book is unique and helps fill a need of all engineers and those in the business and professional world who must deal with engineers.

PROFESSIONAL ENG.

...als E..., U.S. Bureau of Public Roads, Gillette Publishing Co., Chicago, Ill. Price $3.50.

This book fills a decided want in engineering literature, since it defines definitely the meaning of a technical word or phrase. The authors had the assistance of a large number of organizations which enabled them to cover the field with great thoroughness. Engineers having to do with contracts should not be without this book. It will avoid legal trouble. Needless to say, this volume should be on the "must" list of every engineer.

WESTERN CONSTRUCTION NEWS

...lette Publishing Co., Chicago, Ill. 310 pages, ... 6x9. Price $3.50.

Designed for the purpose of giving engineers a dictionary which would not only provide definitions for technical words, but also initiate the standardization of engineering terms, the authors have produced a volume which will fill a definite want in engineering literature. The dictionary portion of the volume is particularly complete in the field of geology as it applies to engineering. The book is definitely less complete in many of the terms which apply directly to certain ... engineering ... construction, and there ... lack ...

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BENJAMIN FRANKLIN Road Builder

BY MARYLAN MORLEY

WHEN we think of Benjamin Franklin, we associate his name with a number of events. We see him flying a kite and discovering that lightning is an electrical discharge; we visualize him strolling the streets of Philadelphia with a baker's roll under each arm and munching on the third; we think of Poor Richard's Almanac and remember that he published it under the pseudonym of "Richard Saunders"; we picture him in regal raiment at the French court of Louis XVI; we recall the "open-face" or Franklin stove, the founding of the academy that eventually became the University of Pennsylvania, the Philadelphia Public Library, and many other notable achievements.

But how many times do we couple his name with good roads? Not many. Yet old Ben was a pioneer in advocating good streets and roads, and had there been an Initiative Measure No. 41 in the City of Brotherly Love along about 1757 the chances are that Benjamin Franklin would have been circulating the first petition. Here's what he writes in his Autobiography relative to his good roads activities of over 180 years ago:

"Our city, tho' laid out with beautiful regularity, the streets large, strait, and crossing each other at right angles, had the disgrace of suffering those streets to remain long unpaved, and in wet weather the wheels of heavy carriages plough'd them into a quagmire, so that it was difficult to cross them; and in dry weather the dust was offensive.

"I had liv'd near what was call'd the Jersey Market, and saw with pain the inhabitants wading in mud while purchasing their provisions. A strip of ground down the middle of that market was at length pav'd with brick, so that, being once in the market, they had firm footing, but were often over shoes in dirt to get there. By talking and writing on the subject, I was at length instrumental in getting the street pav'd with stone between the market and the brick'd foot-pavement, that was on each side next the houses.

"This, for some time, gave an easy access to the market dry-shod; but, the rest of the street not being pav'd, whenever a carriage came out of the mud upon this pavement, it shook off and left its dirt upon it, and it was soon cover'd with mire, which was not remov'd, the city as yet having no scavengers.

"After some inquiry I found a poor industrious man who was willing to undertake keeping the pavement

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clean, by sweeping it twice a week, carrying off the dirt from before all the neighbors' doors, for the sum of sixpence per month, to be paid by each house. I then wrote and printed a paper setting forth the advantages to the neighborhood that might be obtain'd by this small expense; the greater ease in keeping our houses clean, so much dirt not being brought in by people's feet; the benefit to the shops by more custom, etc., etc., as buyers could more easily get at them; and by not having, in windy weather, the dust blown in upon their goods, etc., etc. I sent one of these papers to each house, and in a day or two went round to see who would subscribe an agreement to pay these sixpences; it was unanimously sign'd, and for a time well executed. All the inhabitants of the city were delighted with the cleanliness of the pavement that surrounded the market, it being a convenience to all, and this rais'd a general desire to have all the streets pav'd, and made the people more willing to submit to a tax for that purpose.

"After some time I drew a bill for paving the city, and brought it into the Assembly. It was just before I went to England, in 1757, and did not pass till I was gone, and then with an alteration in the mode of assessment, which I thought not for the better, but with an additional provision for lighting as well as paving the streets, which was a great improvement."

In writing of an improvement he "propos'd" to Dr. Fothergill with reference to keeping the streets of London clean, Mr. Franklin gave his ideas on drainage in this manner:

"And here let me remark the convenience of having but one gutter in such a narrow street, running down its middle, instead of two, one on each side, near the footway; for where all the rain that falls on a street runs from the sides and meets in the middle, it forms there a current strong enough to wash away all the mud it meets with; but when divided into two channels, it is often too weak to cleanse either, and only makes the mud it finds more fluid, so that the wheels of carriages and feet of horses throw and dash it upon the foot-pavement, which is thereby rendered foul and slippery, and sometimes splash it upon those who are walking. My proposal, communicated to the good doctor, was as follows:

Here Mr. Franklin gives his ideas for the "more efficient cleaning and keeping clean the streets of London and Westminister," providing for the removal of dust and mud, the employment of several watchmen, and the supplying them with brooms and other proper instruments. "Good Roads" Franklin finishes his discourse on proper paving with these remarks:

"Some may think these trifling matters not worth minding or relating; but when they consider that tho' dust blown into the eyes of a single person, or into a single shop on a windy day, is but of small importance, yet the great number of the instances in a populous city, and its frequent repetitions give it weight and consequence, perhaps they will not censure very severely those who bestow some attention to affairs of this seemingly low nature. Human felicity is produc'd not so much by great pieces of good fortune that seldom happen, as by little advantages that occur every day.

"Thus, if you teach a poor young man to shave himself, and keep his razor in order, you may contribute more to the happiness of his life than in giving him a thousand guineas. The money may be soon spent, the regret only remaining of having foolishly consum'd it; but in the other case, he escapes the frequent vexation of waiting for barbers, and of their sometimes dirty fingers, offensive breaths, and dull razors; he shaves when most convenient to him, and enjoys daily the pleasure of its being done with a good instrument. With these sentiments I have hazar'd the few preceding pages, hoping they may afford hints which some time or other may be useful to a city I love, having liv'd in it very happily, and perhaps to some of our towns in America."

So add to the numerous accomplishments and activities of the man whose picture has just been removed from the one cent stamp by one of his successors in the Postal Department the designation "Good Roads Advocate."

[Believing this short article worth national attention, we took it from the Montana "Center Line" of May, 1939.—EDITOR.]

▼

NEW TEST FOR MEASURING THE EFFICIENCY OF STABILIZATION

Two test methods for measuring the efficiency of soil stabilization—the absorption test and the test for stability after absorption—are now in general use. A third test was suggested by C. L. McKesson, Director of Engineering and Research, American Bitumuls Co., San Francisco, Calif., in his paper "Research in Soil Stabilization with Emulsified Asphalt," presented at the recent meeting of the American Society for Testing Materials. The new test, a punching shear test, is described as follows:

In May, 1937, A. T. Goldbeck, in the "Crushed Stone Journal," reported results of punching shear tests on stabilized base mixtures. The method proposed at that time consisted of molding specimens 2⅝ in. in height and 4 in. in diameter and subjecting them to shear with a 2-in. plunger on top of the specimen and a 2¼ in. diameter aperture in the plate underneath the specimen.

Experimental work with a number of soils and with quarry fines, following the method proposed by Goldbeck and a modification of this method in which the height of the specimen was increased to 4 in. indicated that some additional useful information might be obtained by a punching shear test. Subsequently, the same general principle was utilized in devising a punching shearing test for 2 by 4-in. specimens identical with those used in the stability test. In this test, a 1-in. plunger is substituted for the 2-in. plunger used in the stability test. The apparatus is otherwise identical.

As the soil specimens are slightly smaller than the inside of the test cylinder, limestone dust is vibrated into the space between the testing cylinder and the specimen prior to the test. The load is then applied on the 1-in. plunger centered on the soil specimen directly over the 1⅛-in. orifice in the bottom, until the maximum is reached.

The gradation of the soil or aggregate used and the angularity of the particles appear to have a substantial effect on the total load in the punching shear test, especially on unstabilized specimens. Although this test method has not as yet been used in specifications, it is believed that it may be distinctly useful in research work and may eventually be utilized in specifications.

▼

500 TRAFFIC ENGINEERS—About 500 men are now employed as traffic engineers. All but 50 of these are in the service of the Federal government, State governments or the 35 cities having formalized traffic control units as part of their municipal administration.

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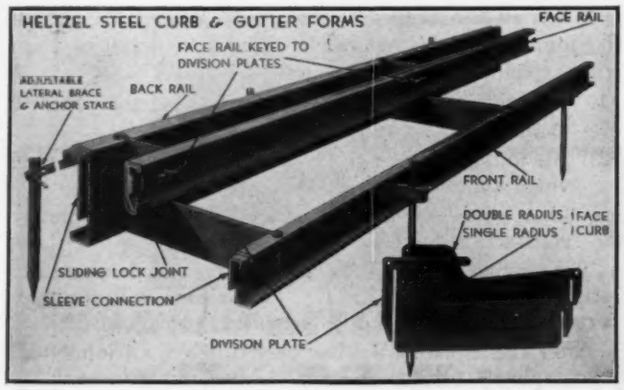

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CAST IRON PAVEMENT TO BE BUILT IN MINNESOTA

CONSTRUCTION will be started shortly on an experimental section of cast iron pavement south of Eveleth, Minn. This stretch will be part of a project for construction of .8 mile of concrete pavement on Trunk Highway No. 53. Bids on the project were opened July 7 by the Minnesota State Highway Department.

St. Louis County, Minnesota, is participating in the cost of this experimental section since the Missable Iron Range is located largely in that county and the county officials are particularly interested in any development which will increase the use of iron in pavement construction.

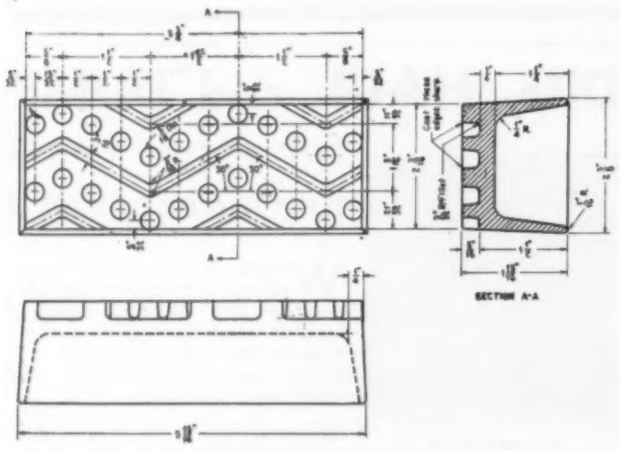


Fig. 2.—Cast Iron Pavement Block Type B. Type A Is Exactly Similar in Design But Is About Twice as Wide.

The experimental section is 600 ft. long and involves the construction of a wearing surface of cast iron blocks on a concrete base (see Fig. 1). The metal for the blocks will be gray cast iron, not chilled. The blocks must be cast to the dimensions shown in the plans (see Fig. 2) within the following tolerances:

Designation	20 blocks measured parallel to ribs		20 blocks measured perpendicular to ribs	
	Maximum	Minimum	Maximum	Minimum
Type A	10 ft. 0½ in.	9 ft. 11½ in.	10 ft. 0½ in.	9 ft. 11½ in.
Type B	10 ft. 0½ in.	9 ft. 11½ in.	4 ft. 0½ in.	3 ft. 11½ in.

Minimum weight, each block, Type A ..... 4.75 lb.
Minimum weight, each block, Type B ..... 2.25 lb.

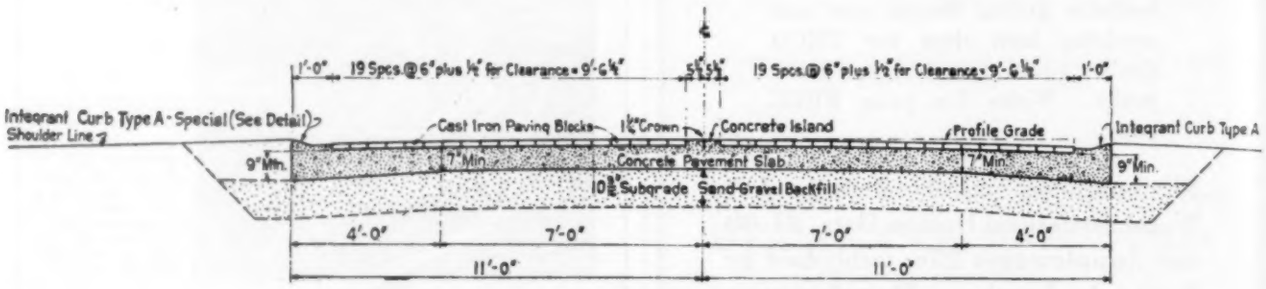


Fig. 1.—Section Showing Details of Pavement.

The construction requirements are as follows:

Immediately after the belting operations on the concrete base, two rows of blocks will be placed on each side of each expansion joint. These blocks will be filled on the inside with concrete, set accurately into place, and brought to the proper elevation by tamping. This concrete will be the same grade as that used in the concrete base except that no coarse aggregate which will not pass a ¾-in. sieve will be used. Joints between these blocks will be cleaned of concrete. All other cast iron blocks will be placed after the concrete base has set.

When all the blocks in each panel have been placed, the joints listed below will be filled to a depth of 1 in. with asphalt joint filler:

1. All joints between the iron blocks and the concrete in the curb and island.
2. All joints between the blocks set in concrete as provided above.
3. One transverse joint on each side of each dummy contraction joint.

The asphalt filler will be poured within a temperature range of 300° F. to 325° F. At no time will the temperature of the material be permitted to exceed 350° F.

After the asphalt filler has been applied, all joints will be completely filled with sand. After the pavement has been in use for a period not to exceed 10 days, the contractor will, when directed by the engineer, sweep all surplus sand from the pavement and saturate the sand in the joints with asphaltic road oil. If the contractor so elects, he may mix the sand with the asphaltic road oil before filling the joints. In this case, a means of compacting the oil-sand mixture in the joints must be provided.

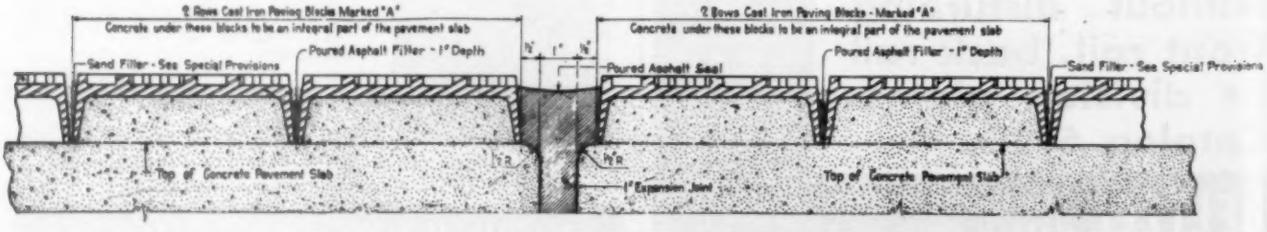
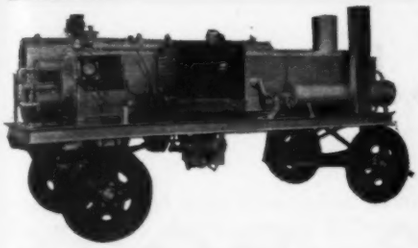

2 Rows Cast Iron Paving Blocks Marked "A"
Concrete under these blocks to be an integral part of the pavement slab
Poured Asphalt Filler - 1" Depth
Sand Filler - See Special Provisions
Top of Concrete Pavement Slab
2 Rows Cast Iron Paving Blocks - Marked "A"
Concrete under these blocks to be an integral part of the pavement slab
Poured Asphalt Filler - 1" Depth
Poured Asphalt Seal
Sand Filler - See Special Provisions
1" Expansion Joint
Top of Concrete Pavement Slab

Fig. 3.—Typical Section Showing Expansion Joints.



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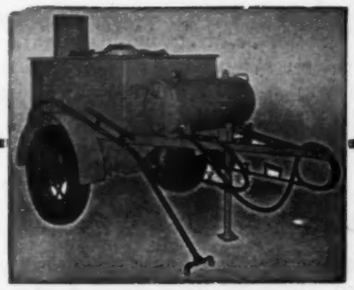

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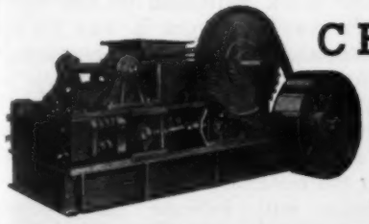

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EDITORIAL

A PLEA TO NORTH DAKOTA: DON'T PAUPERIZE YOUR NEIGHBOR

CITIZENS of North Dakota: A thief is sneaking into your midst. If a thief broke into your home and attempted to steal your money and other valuables you would shoot him. I would, and I believe you would, too, if you had a gun in the house and had a steady hand.

On July 11 you will have an opportunity to kill the thief now sneaking into your commonwealth. I refer to the initiative measure which proposes to stop *all* highway and road construction, on both the state highway system and the county road systems. And that is not all, the measure proposes, also, to divert about half of the regular maintenance funds. You are going to be asked to let half of your state road system go to ruin and all of the county road systems. This condition, if the measure is voted into law, will prevail for a two-year period. In that interval, you know as well as I, that damage done to the roads because of lack of maintenance for that length of time, will require many years more of continuous, added expenditure effort to get the roads back into the same condition they are today. And comparing North Dakota's roads, now, with those of other states it certainly has a long ways to go to place them on a parity.

Think what this diversion means if you vote it into law. No highway construction contracts can be awarded after the taking effect of the Act; this applies also to grade separation projects or other similar classes of improvement where even 100 per cent of the funds are donated by the Federal government, for the reason that the state highway department is the contracting agency and will be prohibited from awarding such contracts. Construction of all feeder and secondary roads and bridges, also county roads, will be stopped.

One of the serious effects of this proposed measure, if enacted, will be distressingly evident in the winter time and during the spring breakup. When the roads become blocked with snow or axle deep in mud, how is the doctor going to be able to get to your home to save the life of one of your family or to cure his ills or relieve his pain? He won't be able to do so. Think how closely interwoven a good road system is with your very existence! The snow-blocked highway problem and axle-deep mud problem will be more acute on the county roads, from the local standpoint, because the counties' share of the gasoline and motor vehicle taxes is also diverted under the proposed measure, and the counties are going to be *unable* to provide for ANY ordinary maintenance or improvement work and consequently will be *unable to open any roads* in the case of snow blockades.

The initiated act provides that all funds in excess of $1,250,000 shall be diverted and the maintenance expense per annum shall be limited to $1,250,000, which is approximately one-half of the average amount ordinarily required each year. It is therefore evident, that the mileage of state highways which can be properly maintained will be reduced to about 3500. What will happen to the remaining 4000? Deterioration for 2 years will practically destroy them! Undoubtedly, the 3500 miles that can be maintained must be selected from the more heavily traveled routes, which will be principally on the U. S. numbered system. Any statement by anyone to the effect that there will be more maintenance work available under the proposed plan is a deliberate misstatement of the situation that will occur, and can be definitely branded as untrue.

The deterioration (rather deliberate destruction, if the act is voted) of 4000 miles of state highways and a much greater mileage of county roads cannot be anything but a calamity in this age of extensive road use by motor vehicle owners. Every mail route, every bus route, every school bus route, many freight and passenger routes will be crippled or completely abandoned. It is inconceivable that the voters of North Dakota will take a backward step so far-reaching as this.

Where is North Dakota ahead, even immediately, in a financial way? You propose to divert road building funds for Old Age pensions. Supposing you do. Of course most all of the employees of the state highway department, clear down the line, will have to be discharged. Where will the money be obtained to care for them? Would you deliberately pauperize your neighbor? I can't believe it. Certainly it is safe to assume that prosperity cannot be attained in any degree in North Dakota by deliberately diverting funds which you, as a motor vehicle owner, have pledged for highway work and which were paid by the road user for that purpose. Certain it is, too, that the proposed plan of expenditure cannot be of any wide benefit.

Therefore, you should kill this proposed measure on July 11, as you would eliminate any thief or moronic renegade attempting to destroy your home.

▼

USE LESS WATER

THE middle of May the writer stopped off in an eastern state to look over a soil stabilization experimental job. The job was about 9 miles long. On the first 3 miles an MC-2 was employed; on the middle section a bituminous emulsion; and on the last part a tar. While we believe improper construction procedure and perhaps incomplete or improper test procedure was employed, it is not the purpose of these remarks to criticize the job but to bring to light what we believe is a fundamental point that should be studied.

Observation of the work indicated to the writer that too much water was used, yet it was claimed by the engineer that only the amount necessary for greatest density was introduced. The point we believe should be watched in this type of work is to keep the water content on the lean side of the curve. Just enough water should be introduced to make the bitumens readily coat the materials, and no more.

Our test procedures will indicate the optimum water content for greatest densification. We believe, however, that it is easy to err on this point and propose that water content be kept just below optimum when using fluxed bitumens.

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NEW EQUIPMENT AND MATERIALS

New Carryall Scraper

A new scraper — the Model P Carryall — has been brought out by R. G. Le Tourneau, Inc., Peoria, Ill. This model has a new tailgate arrangement, higher sides and a stronger yoke. It has a capacity of 11 yds. struck measurement, an 8 ft. 6 in. cutting blade, and weighs from 18,200 to 18,600 lb. (depending on tire equipment). The tailgate sheaves are placed on the sides of the bowl instead of on the top so as to keep them free from dirt, sand and gravel and to control the tailgate more efficiently from the center of the load rather than the top. A positive ejector tailgate — cable controlled — gives regulated dumping in any required thickness, and fractional inch control of the cutting blade results in greater margin of scraper usefulness. Extra high sides on the scraper bowl retain the extra pay yards that are frequently wasted over the sides with big loads. A new curved yoke strengthens the entire assembly and eliminates stress points. Five box beam channels are built into the sides of the bowl. On the rear is a drawbar hitch that can be used for either a pusher block or a hitch for tandem scraper operation. The Model P, like all LeTourneau equipment, is constructed from a special analysis steel and is arc welded throughout. The Model P is one of a complete series of LeTourneau scrapers built with the 8 ft. 6 in. cutting edge, complementing the line of Carryalls with the 10 ft. blade.

LeTourneau Model P Carryall

▼

New Highway Mower

After exhaustive field tests under a wide variety of the toughest kind of cutting conditions, the Jacobsen Manufacturing Co., Racine, Wis., pioneer builders of power mowers, has announced full-time production of its new improved motor scythe designed for highway maintenance and park, municipal golf courses. Equipped with a 4-ft. sickle bar and powered by a specially built 2-h.p. Jacobsen engine, it is claimed the mower has a capacity equal to seven men with hand scythes and will cut through the tallest grass and toughest weeds. It is a light yet sturdy, well-balanced machine with an auto-type differential and separate sickle and traction clutches. It cuts as low as 1½ in. and as high as 5½ in. It has the power and flexibility to work with equal efficiency on uneven ground, along ditches, hillsides and other hard-to-get-at places. Many Jacobsen motor scythes are already in use on parks and highways throughout the country. They are stated to be particularly well suited for cutting the parkways that separate one-way traffic lanes on many of today's super-highways. Cities are also finding them valuable auxiliary equipment when used both as weed cutters and as field mowers for parks, picnic grounds, recreational fields and other areas where rough cutting of grass is desirable.

New Jacobsen Motor Scythe

▼

New Front Dumping Shovel Attachment

A patented shovel attachment that uses a powerful chain crowd with double leverage on the edge giving an action somewhat like that of a trench hoe, but in reverse,

has been announced by the Speeder Machinery Corporation, 1201 Sixth St. S. W., Cedar Rapids, Ia. The attachment, developed for use with Speeder or Link-Belt convertible machines, has been designed for handling material that cannot advantageously pass through the bucket, and for sub-grading work where a skimmer might ordinarily be used. As there is no hoist line running down to the top of the bucket, it can work in places where an ordinary shovel might foul. The new unit is offered as being particularly suited for land clearing work, digging out trees, stumps, boulders; drainage ditch cleanouts and the building of new ditches; ripping up and loading old concrete or macadam paving; loading peat moss, etc. It is stated that

Johnson Front-Dumping Shovel

in loading odd shapes of stone or torn-up pavement, the operator can balance a huge slab on the bucket and practically lay it into truck.

New 3½-S Mixer

A new 3½-S non-tilt mixer, a product of the Kwik Mix Concrete Mixer Co., a

New Kwik-Mix 3½-S Trail Mixer

subsidiary of the Koehring Co., Milwaukee, Wis., has been brought out. Outstanding feature of this design is the absence of a drum ring gear, drum drive pinion and countershaft. The drum is driven by the rubber drum rollers, reducing noise, vibration and excessive maintenance costs. The mixer is easily handled by one man, has a low shoveling hoist, wide hopper, fast discharge and weighs only 980 lb. Another feature is the extra-size batch hoppers provided with gate to furnish storage of batch while another batch is mixing. Thus a complete batch is ready for charging when the drum is emptied.

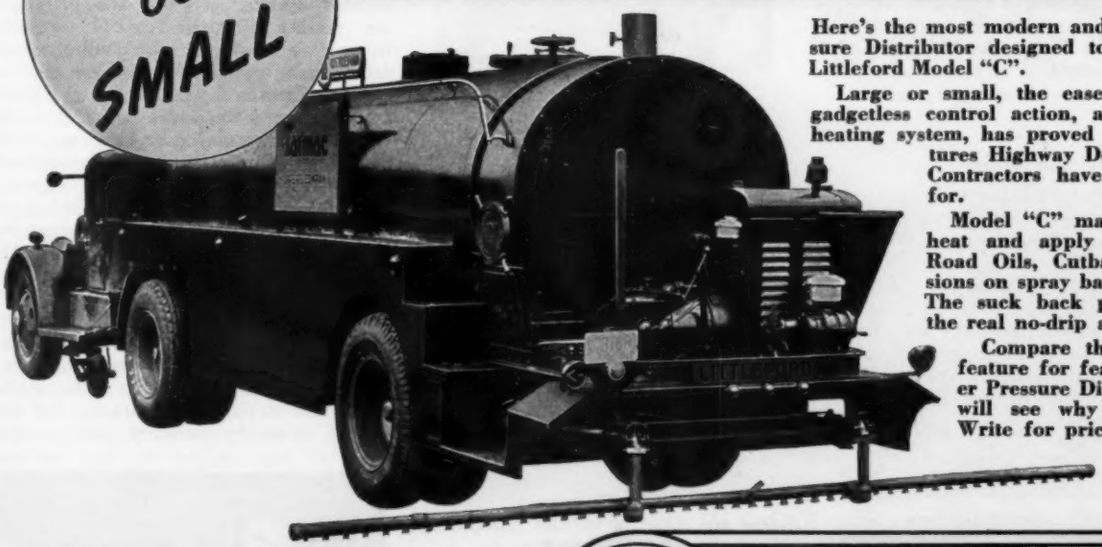
New Double Felt Seal Bearing to Single Row Widths

A line of sealed ball bearings along entirely new and simple principles has been developed by SKF Industries, Inc., Philadelphia. The seal used in these bearings is one that can be applied to bearings having a standard single row S.A.E. dimension of bore, inner and outer race width. This development has been evolved by departing from the conventional stuffing box type of seal in favor of modern air-cleaner principles sealing against dirt by the felt fibre contact on the polished surfaces of the inner race, and by the utilization of the natural tendency of deflected felt to resume its original flat shape. Extensive tests are stated to have proved that the new seal retains the bearing lubricant and excludes any dust or dirt entry into the bearing itself, yet the sealing action is so light that the friction drag has been greatly reduced. The bearing is, therefore, suitable over a great range of speed. Even though the bearing is in the standard single row width, which in itself simplifies design and saves space, an ample lubricant space is provided as is indicated in the photograph. It is

SKF Red Seal Bearing

LARGE or SMALL

THEY OPERATE EFFICIENTLY



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called The SKF Red Seal Bearing, "the stop signal for dirt." Its designation is 6200 RS, and it is available for shafts up to approximately 1 in. in diameter.

New Improvements in Hercules Rollers

Two improvements in its Ironmold roller home have been announced by The Hercules Co., Marion, O. The old style bevel reversing gear for controlling the forward and reverse movement of the

The Spiral Bevel Gears

roller has been replaced by spiral tooth gears which give smoother, quieter and much longer operation. The gears are of alloy steel, cut teeth, and heat treated. The net result of using spiral gears is stated to be increased rolling hours—more efficient operation with a marked reduction in maintenance cost. Another improvement incorporated in Hercules rollers is the hinging of the engine hood. Formerly the hood was made in one piece and was quite difficult for one man to remove. The hood is now divided and hinged similar to automotive types and can be raised from either side of the roller by one man with ease. This feature materially increases accessibility to the motor for necessary adjustments.

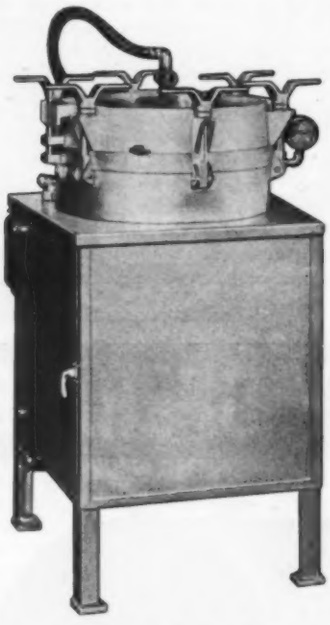
Welding Truck

An outfit that brings the welding shop right to the job has been placed on the market by R. G. LeTourneau, Inc., Peoria, Ill. This Tournacar welding truck has a welding unit made by the Lincoln Electric Co., weighing only 320 lb. The welder is a compact 200 ampere generator with patented dual continuous amperage and voltage control which affords the operator independent regulation of arc length and heat, so that he can adjust each for any type of work and rod. He can weld flat, vertical or overhead. It has a stabilized arc which means that the weld will possess physical properties equal to or better than the metal welded, and will weld all materials 22 gauge and up. The power is transmitted instantly directly from the truck motor to the generator by a patented LeTourneau split shaft take-off which fits directly behind the transmission, especially designed for this type of operation. The welding unit takes up so little room that there is plenty (120 cu. ft.) left to haul tools and extra parts for major repairs or structural steel work.

Tournacar Welding Truck on the Job

New Oil Reclaimer

A new oil reclaimer designed as a simple and economical means of purifying all types of lubricating oils has been brought out by The Hilliard Corporation, 106 Fourth St., Elmira, N. Y. By a process of filtration, through a highly effec-



The Hilco Oil Reclaimer

tive filtering medium being marketed under the trade name of Hilite, all the solid matter, sludges, carbon, abrasives, and acidity are claimed to be removed to produce a clear filtered oil. By a simple process of evaporation, moisture and fuel dilution are removed to restore the viscosity or body to the oil. The Hilco is all-electric and automatic in operation. It is used for all types of gasoline, gas and Diesel engines. It is also used to reclaim oil from air compressors, vacuum pumps, trucks, tractors and stationary engines. The reclaimers are made in various sizes, ranging from 6 to 1500 gal. per day.

New International T-35 Tractor Shovel

Special modified International T-35 and TD-35 tractor shovels have been announced by the Frank G. Hough Co., 919 N. Michigan Ave., Chicago, Ill. These new shovel models are built around special T-35 and TD-35 tractors which have been modified

New International T-35 Tractor Shovel

especially for shovel service. This modification includes special long tracks, six roller truck frames, spring loaded foot clutch, double steering clutches, reverse radiator fan, etc.

Hand Pump for Testing Diesel Fuel Injectors

A compact, portable hand pump for testing Diesel fuel injectors in the field, is now being made by Diesel Equipment Corporation, 4401 N. Ravenswood Ave., Chicago, Ill. It is designed to permit the user to check all size injectors of all standard makes, including Deco, Timken, Bendix, Bosch, Caterpillar, Hesselman, International and others. It is stated that so simple is its use that testing the adjustment of fuel injection systems can be made a routine service job like greasing and oiling. Any average mechanic, using the Deco hand pump, can easily measure injector opening pressure and determine the correct adjustment; tell instantly whether the spray pattern is uniform, and detect many other irregularities, such as stuck needle valves and dribble or leakage around valve seats, which normally would not be discovered without checking. With the Deco hand pump opening pressure can be tested without removing the injectors from the engine block, thus obviating the danger of damaging the tips during removal. Only when the test indicates that adjustment is needed is it necessary to remove the injectors. The compactness of the Deco hand pump makes it especially handy for use in the field. It stands only 9 in. high. The pump proper weighs but 6 lb.; the detachable handle 2 lb. It fits easily into service kits or tractor and tool boxes. It can be used any place there is

Deco Hand Pump

room for setting the base, 4¾ in. x 2½ in. Because it is so small and light, it can be carried to the top of big Diesel engine plants and used in cramp spaces where testing with large outfits would be impractical. When used in laboratories, the pump can be bolted down—three holes are provided in the base for that purpose. To insure absolute accuracy in testing, the plunger, barrel, suction valve and delivery valve of this pump are identical with those used in Deco's precision-built fuel injection pumps.

▼

Improved Lubricators

A number of improvements have been made in the "Swift" lubricators, a product of the "Swift" Lubricator Co., Elmira, N. Y. These new features include knurled composition handles in place of wood wheels, air-cooled condenser giving greater condensing capacity, thumb-screw drain cock making wrenches unnecessary, and interchangeable parts. In addition Pyrex sight-feed glasses are optional extra for high pressure and superheated steam. These sight-feed lubricators are intended for steam-driven pumps, engines, hoists, hammers, cranes, shovels, road rollers, etc. They are made in two classes—single connection and double connection.

Class F Single Connection

▼

New Line of Engines

A new line of engines, known as the multi-fuel, polycycle type, stated to be unique in their basic design, has been introduced by the Waukesha Motor Co., Waukesha, Wis. Intended for use with oil, gasoline, butane, or producers on natural gas, every engine in this series is convertible after its manufacture by simply changing the fuel burning accessories. It is claimed that since none of the internal mechanism is changed and the engine is basically the same except for fuel accessories, its weight as an oil engine is only a few pounds greater than its weight as a gasoline engine, and its weight as a gasoline engine is exactly on a par with gasoline engines of equivalent size and power in today's conventional design. Among other advantages claimed for these engines are greatly reduced maintenance and service costs because of the absolute interchangeability of service parts as between gasoline and oil engines and the large quantity production. Rods, bearings, pistons, rings, pins, valves, camshafts, crankshafts, crankcases, cylinder heads, in fact all of the major parts, are the same whether the engine is an oil engine or a gasoline engine.

▼

New Pipe Arch Culvert

A new pipe culvert designed primarily for locations of low clearance or headroom has been announced by the Armco Culvert Mfrs. Association, Middletown, O. The top and bottom of the Pipe-Arch are factory-riveted together into a single piece. The long section may be fastened together with a standard coupling or connecting band of the same shape. Extensive dead-load and live-load tests are stated to show that the Armco pipe-arch has strength closely comparable to that of standard corrugated pipe of equivalent span or diameter. This new product is available in spans ranging from 18 to 72 ins., with the rise being a little less than two-thirds the span. It is available in plain-galvanized or with bituminous paved-invert.

▼

New ½-Yd. and ⅜-Yd. Power Shovel

A new ½ yd. and a new ⅝ yd. convertible crawler power shovel has been announced by P. T. Redfern, Sales Manager, The Byers Machine Co., Ravenna, O. Model 65, the new half yard, weighs 30,000 lb., is powered by a 50 H.P., 6-cylinder motor and has a safe crane lifting capacity of 12,500 lb. at 10 ft. radius on a 30 ft. boom. Model 75, the new five-eighth yard, weighs 32,500 lb., has a 60 H.P., 6-cylinder motor and lifts 13,000 lb. In new catalogs issued on these models, features include four hook rollers on the turntable, roller bearings on major shafts, unit alloy steel casting construction, postive independent cable or chain crowd shovel attachments, increased speeds, scientifically ventilated cabs and ability to swing while travelling. On crane or dragline operation, these models always have travel clutches ready for immediate engagement, thus providing a time saving advantage. Trench hoe attachment has 17 ft. boom, 7 ft. 9 in. stick, and either bottom or front dump buckets

Cut Yardage Costs to the Bone
The ⅜ and ½ Yard Insley Type K Excavators are the answer to the problem of lower yardage costs. Ample power for faster digging and swinging. Sturdily built and easy to handle in close quarters, they are ideal equipment where time and space demand maximum efficiency. Ask for Bulletin No. 137 for complete specifications. Insley Manufacturing Corporation, 801 Olney Street, Indianapolis, Indiana.
● Available in 1/2 and 3/8 cubic yard capacities. Electrically welded for maximum strength. Ball bearings eliminate friction and wear. Electric bucket trip facilitates accurate placement.
INSLEY

PROFITABLE DITCHING

This is the smallest of the Barber-Greene Vertical Boom Ditchers, the Service Special. It is quickly hauled by trailer, making the smallest ditches machine jobs. There is also the Utility Special for digging close to obstructions, the Pipe Line Special for cross country and the big Standard. Write for the B-G Ditcher Catalog.

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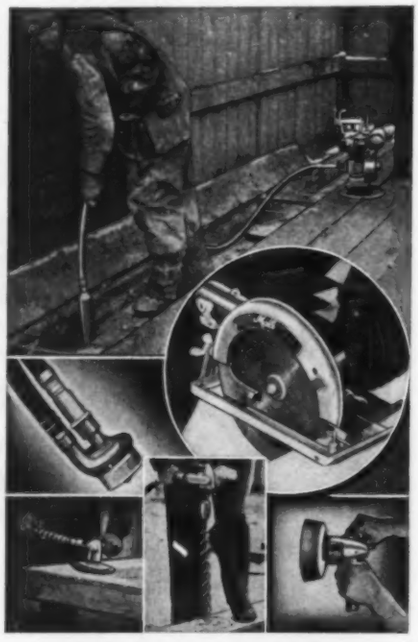
of various cutting widths. Single purpose skeleton trailer of new design also is available for transporting these machines.

▼

New Portable Gas Engine Unit

A new 1 h.p. gas engine flexible shaft machine, known as the Jack-of-all-trades, has been announced by the Mall Tool Co., 7740 South Chicago Ave., Chicago, Ill. Electric wires, generator sets, or air compressors are not necessary to operate it. The power is developed by the gas engine and delivered to the working tool by means of heavy duty flexible shafting. With its high power and variable speeds, there is claimed to be practically no limit to its adaptability.



Mall Portable Gas Engine Unit

This tool has attachments for concrete vibrating, concrete surfacing, sawing, drilling, grinding, wire brushing, form sanding and pumping. It is unusually light in weight, powerful and portable. It can be carried up a ladder by one man easily and placed on a scaffold of in confined places. It can also be operated while suspended from a rope or hook.

▼

New Tar Kettle

A new model tar kettle made in capacities from 60 to 300 gals. has been announced by W. G. Chausse, 80 East Jackson Blvd., Chicago, Ill. The kettle with an extreme low center of gravity and easy loading height of 45 ins. is mounted on elliptic springs supported by a drop axle, on 6.00x16—6 ply rubber tires. The water

Chausse "Helhite" Kettle

and fireproof covers and heavy metal firepot may be removed for easy cleaning. The sides, top and bottom of heavy sheet metal are mounted on a heavy reinforced frame of angle iron with all seams electric welded. The insulation is of cast (asbestos base) fireproof and heat retaining material of 1½ ins. thickness, that not only saves fuel, but is stated to produce a supply of "hot stuff" in 30 minutes. The fuel line is of copper.

▼

New Excavators

A new combination shovel, dragline and crane in the 1-1¼ yd. class has been announced, after extensive field tests, by The Osgood Co., Marion, O. This new machine is designated as the Type 60, and is available as the Model 600 with 20 ft. boom, 16 ft. handle, 1 cu. yd. dipper, 100-h.p. gasoline motor, 11 ft. 10 in. crawlers, and as the Model 605 with 21 ft. boom, 16 ft. handle, 1¼ cu. yd. dipper, 120-h.p. gasoline motor, 12 ft. 3 in. crawlers. Diesel power may be substituted for gasoline. While many new features are found in the Type 60, several Osgood features such as unit cast steel construction, Osgood "Servo" control of drum shaft clutches, Osgood vacuum control of swing and travel clutches, safety fuel tank, high pressure lubrication, silent chain power transmission, etc., are incorporated in the new machine. A liberal use of special steels, best suited for the service requirements, has been made in the Model 60. Shafts are of Hy-ten and vanadium steels, propelling gears are of chrome, crowding racks and dipper lip and teeth of manganese, clutch housings are of polished nickel iron. All high speed shafts are mounted in anti-friction bearings. Vertical swing shaft has square section, top and bottom, and no keys are used. Mitre and spur gears above deck are of alloy steel, teeth cut from solid blanks, and heat treated. A new feature on the Type 60 is the bolting-on of clutch and brake housings on the drum shaft. The drums are of cast steel, the housings of close grain nickel iron, highly polished. Bands, of the outside, contracting type, are in halves for easy replacement, and lined with molded blocks. Osgood "Servo" control of clutches and brakes completes the picture for smooth, long and easy operation. In shovel service an independent chain crowd unit is mounted on the main body casting. Crowd is powerful and retract is fast. The chain sprocket at the boom foot is in line with the boom foot hinge pins, and therefore the crowd chain tension is self-adjusting to all boom angles. The crowd chain has a tensile strength of 75,000 lb. Shovel boom and handle are of all-steel box girder type, electrically welded. Boom point sheaves are 30 in. diameter, insuring long rope life. Dipper has renewable lip and reversible teeth. Dipper is tripped through the Osgood type vacuum trip. Crane booms are of box type with heavy chord angles and pipe lattice, all electrically welded into a strong but light unit. Booms are made in two sections for ease in handling and for insertion of lengthening units. Tagline for clamshell service is built into the boom, and fairlead for dragline service is of the universal type, leading rope true and fair at all boom angles.

WITH THE MANUFACTURERS

Associated Equipment Distributors Meet in Chicago

The Associated Equipment Distributors held their semi-annual meeting at the Edgewater Beach Hotel in Chicago, on June 21, 22 and 23.

All officers, including the Board of Directors and the Board of Governors were present, along with 36 additional members, with the exception of A. C. Blaisdell, long-time secretary-treasurer of the association. J. S. Gilman of the Wm. H. Ziegler Co., Minneapolis, Minn., was present, acting in the capacity of secretary during the illness of Secretary Blaisdell.

On the opening day, reports from the committee chairmen were heard and general business of the association was discussed, during which time a policy was adopted whereby invitations will be extended to manufacturers who are not allied members of the A. E. D.

On "Manufacturers' Day," the second day, all regular members and allied members (manufacturers) were invited. With 71 manufacturers present and a full program of vital subjects, this day was successfully and well occupied. Outstanding were papers presented by A. F. Sersanous, Pres. of the Board of Governors, W. G. Morgan, second Vice-pres., and Mr. Marshall of the A. G. C.

Mr. Sersanous' paper entitled "As We Find Ourselves Today" presented the problems that face the distributors of road-building and construction machinery and suggested solutions to those problems.

Mr. Morgan's subject was "The Miller-Tydings Law as We Think It Might Be Applied to Our Industry."

Mr. Marshall presented a paper written by W. A. Klinger, a past President of the Associated General Contractors of America, entitled "Re-employment in Construction." This paper, supplemented by chart illustrations showed the importance of construction to the economic system of the nation.

During the afternoon of Manufacturers' Day, individual group meetings were held, the groups being made up of allied members who manufacture similar types of machinery.

The remaining sessions were attended by Officers, Directors and Governors, and as a whole the meeting was one of much enjoyment, interest and benefit.

▼

Thomas L. Barret Dies

Thomas L. Barret, who had been in business in Louisville, Ky., for over 30 years operating a builders' supply company bearing his own name, died June 5 of heart attack. Mr. Barret had a wide acquaintance in Kentucky and other states, among architects, engineers, building and road contractors, quarrymen and others in allied industries. He also had been associated as a dealer with various manufacturers of motorboats and had operated motorboat agencies here and in Miami, under the name of Barret Boats, Inc. He was a devotee of power boating and for years had been prominent in the activities of the Louisville Yacht Association, the Pastime Boat Club and the Louisville Boat Club—as well as being member of many other organizations. His summer cottage, "The Lighthouse," on the River Road, Louisville, was a well-known landmark and a rendezvous for friends and business associates. He also had an apartment building in Miami Beach and an office in Miami. W. J. Steinhauer, who had been associated with Mr. Barret for the last 18 years, will carry on the business.

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Austin-Western Announces New Plant Developments and Sales Executive Changes

Along with plans to erect new additional buildings and consolidate all manufacturing facilities at Aurora, Ill., S. F. Beatty, President of the Austin-Western Road Machinery Co., has announced the following executive changes designed to provide added efficiency with complete coordination throughout the entire organization: Vice-President F. L. Jerome has been made assistant to the president. Vice-President H. M. Kleiser has been placed in charge of sales, advertising, service, and research. R. K. Stiles has been made sales manager. A. O. Teckemeyer will become manager of governmental sales division. Austin-Western formerly distributed its products through coast to coast branch office sales organizations, but a year and a half ago the marketing setup was changed and now their company distributes its complete line of road building, rock crushing, earth moving, and street cleaning machinery through a large number of well-known machinery equipment dealers, located throughout the country and in all parts of the world.

▼

Worthington Promotes Works Executives

H. C. Ramsey, Vice-President, in charge of operations of Worthington Pump and Machinery Corporation has announced several promotions to key positions in the corporation's Harrison, N. J., and Holyoke, Mass. works' staffs. L. C. Ricketts, a member of the Worthington organization for the past ten years, and recently general superintendent of the corporation's Harrison Works, has been appointed manager of that works. W. D. Sizer, who joined Worthington in 1920, is appointed executive engineer in charge of all engineering activities at Harrison. B. R. McBath now assumes full responsibility as engineer in charge of the centrifugal engineering division, succeeding W. D. Sizer. J. H. Brautigam succeeds W. H. Scherer as manager of the corporation's Holyoke Works. This appointment returns Mr. Brautigam to Holyoke at which point he joined the organization in 1928, leaving there to assume his duties as assistant works manager of the Harrison plant in 1932. W. H. Scherer will devote his entire time to the further development of manufacturing methods in all of the corporation's plants, as assistant to H. C. Ramsey with headquarters at Harrison.

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MUNICIPAL SUPPLY COMPANY
SOUTH BEND, IND.

William Blackie Appointed Controller of Caterpillar Tractor Co.

Appointment of William Blackie as controller of the Caterpillar Tractor Co. has been announced by company officials. Mr. Blackie has been a supervising manager with the Chicago office of Messrs. Price, Waterhouse & Co., prominent accounting firm. A native of Glasgow, Scotland, Mr. Blackie attended grade and high schools there and served a five year apprenticeship for the degree of chartered accountant. He attended classes at Glasgow University in the course of his apprenticeship, and on receiving the degree in 1930, immediately came to the United States to join the Chicago organization. Thereafter, he became a certified public accountant and a member of the American Institute of Accountants. For the past nine years, Mr. Blackie has participated in his firm's independent audit at "Caterpillar," so he is familiar with the company, and with the city of Peoria, where he will make his home.

▼

C. A. Fine Now Alemite Distributor for Southern California

Seventeen years ago, C. A. Fine, joined the Stewart-Warner Corporation, at Los Angeles, Calif. as a salesman for the then Southern California Alemite distributor. On June 1, as the result of a recent Stewart-Warner appointment, Mr. Fine has returned to Los Angeles—as Alemite distributor for Southern California, in charge of the Alemite Company of Southern California. For three years prior to his present appointment Mr. Fine was sales manager of the Alemite retail sales division. Previously, he was in charge of Alemite equipment sales in the east. He inaugurated the present Alemite industrial department, shortly after completing a two years Alemite sales apprenticeship in Southern California, where he is now in control.

▼

New Worthington Directors

H. C. Beaver, President, Worthington Pump and Machinery Corporation, Harrison, N. J., has announced the election of Clarence E. Searle, of Bronxville, N. Y., and Hobart C. Ramsey, of Short Hills, N. J., to the Board of Directors. C. E. Searle has been associated with Worthington since 1932, when he joined the organization as vice-president in charge of sales. In his early business career he was connected with the Western Electric Co. of Chicago, the Fort Wayne Division of the General Electric Co. in their Chicago District Office, and for 24 years with the Allis-Chalmers Manufacturing Co., Milwaukee, 17 years of which he held the position of general representative in charge of that company's sales organization. H. C. Ramsey was educated at the United States Naval Academy, Annapolis, and served in the United States Navy during the World War, attaining the rank of Lieutenant Commander. He joined Worthington in 1920 entering the export department as sales engineer, later becoming manager of that department. He has occupied various positions with the corporation. In 1928 he was made assistant general sales manager. In 1930 he was elected vice-president in charge of the corporation's international business, and in this position he spent a large part of his time abroad. His activities in recent years have been concerned with sales of equipment to the railroads, marine and oil refining industries, as well as exercising directional charge over Worthington's foreign associated companies, and the export division. In 1937 he was placed in general administrative charge of operations, which position he now holds.

▼

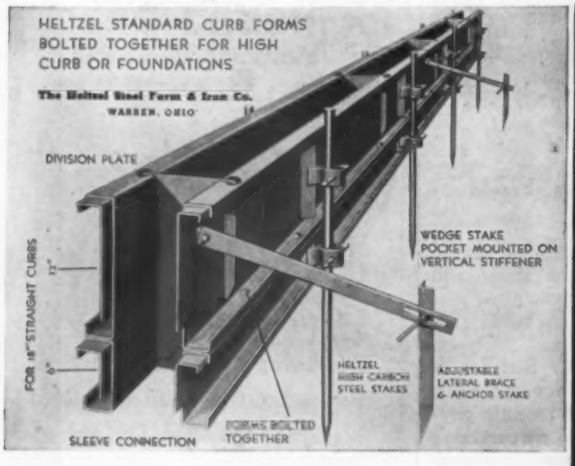
Cletrac Merchandising Organization Revamped

Important changes have been made recently in the marketing set-up of the Cleveland Tractor Co., Clevleand, O. Operations have been organized into four main divisions—manufacture, finance, merchandising and export. Each of these three divisions is headed by a vice-president and the fourth by the treasurer. Activities are headed by the newly elected executive vice-president, H. P. "Herb" Mee, who comes out of retirement to re-assume his established place as one of the most aggressive and successful merchandisers in the crawler tractor industry. Mr. Mee headed The Caterpillar Tractor Co.'s treasury department all through the recent depression, and later was in charge of that company's sales. W. Ellzey Brown, vice-president, is Mr. Mee's chief aid in charge of merchandising and all promotional activities including advertising and service. Mr. Brown brings to Cletrac a wide experience in this work from his previous connections with Allis-Chalmers, Caterpillar, Monarch and Fordson. At the head of the export division is Henry J. Leisenheimer, who has long been a vice-president of the company directing export sales with great success. H. R. Chaffee, Region Vice-President at New York will direct business in the New England states. Sales activities in seven western states of the Pacific Coast region are directed by R. E. Anderson, Regional Vice-President. In the south, Mr. Anderson will be aided by Chester J. Deutsch, the company's Southern California manager who will have charge of organizing that highly fruitful territory. Another important member of the Cletrac operating committee is the company's treasurer, E. M. Bell, a young man who has been with the company for several years, and who, in collaboration with Mr. Mee, is in charge of finance, credit, accounting and collection problems. Cletrac's engineering and manufacturing is headed by J. G. Heaslet, who has directed these company activities for many years. Under him is J. E. Tom, chief engineer, who has spent most of his business life with Cletrac.

▼

C. W. Grange Now Advertising Manager for Alemite

C. W. ("Ted") Grange joined the Stewart-Warner Corporation July 1 as advertising manager of the Alemite division, according to an announcement by F. A. Hiter, vice-president and general sales manager for the Stewart-Warner Corporation. L. R. Light will act as assistant to Mr. Grange. C. C. DeWees will continue



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SUBGRADE TESTERS
SUBGRADE PLANERS
TOOL BOXES
FINISHING TOOLS FOR CONCRETE ROADS

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

in his present capacity as advertising manager of the Stewart-Warner radio and household appliance divisions, with W. E. Macke as assistant. Mr. Grange came from the International Research Corporation where he has been regional sales manager for the last six months, a position to which he was advanced after serving as advertising director for one year. He joins the Stewart-Warner Corporation with a rich background of merchandising, sales and editorial experience. For 12 years, until 1937, he was a member of the Chicago advertising staff of the Curtis Publishing Company, acting in a merchandising and sales capacity. Previously, for seven years, he was a member of the editorial staffs of Omaha, Louisville and Owensboro, Ky., newspapers, and reporter and news writer for the Associated Press in Chicago.

▼

American Manganese Steel Expands Main Plant

The American Manganese Steel Division of The American Brake Shoe & Foundry Co. have expanded their main plant at Chicago Heights, Ill. Six additions and a new administration building were included in this improvement program. The new administration building is 105 by 94 ft. 2-stories. In addition to executive offices, this new building houses the accounting and engineering departments, drafting and blue print rooms, sales, advertising, research and purchasing departments. Classrooms for a welding school are provided for in the basement. The other improvements include: a 2-story 82 ft. by 55 ft. employees welfare building; a 120 ft. by 80 ft. addition to the west foundry building; a 2-story, 122 ft. by 152 ft. addition to the pattern storage building; a 50 ft. by 80 ft. machine shop addition; a 50 ft. by 200 ft. shipping room addition, and a new heating plant, 50 ft. by 48 ft.

▼

Livingston Now Manager of Media Department of Ketchum, MacLeod & Grove

C. E. Livingston has been appointed manager of the Media Department of Ketchum, MacLeod & Grove, Inc., Pittsburgh, Pa. He is a graduate of Princeton University and of the Harvard Graduate School of Business Administration. He has had years of experience in research and analytical work.

▼

Hayes Parsons Now District Representative for Both Speeder and Link-Belt

Link-Belt Company, Chicago, has announced that Mr. Hayes Parsons, 511 East 47th St., Seattle, Wash., district representative for the sale of the Speeder Machinery Corporation's line of crawler, truck and tractor mounted shovels, draglines, cranes, ¾ to 1 yd. capacity, will now also represent the Shovel Division of Link-Belt Company, Chicago. Thus, he is adding the Link-Belt line of crawler-mounted, hydraulic-power-controlled, Speed-o-Matic machines, ranging from 1¼ yd. to 2½ yd. capacity. Robert M. Taylor, Jr., located at 1177 Howard St., San Francisco, formerly associated with "P. & H.," will assist Mr. Parsons in handling the Link-Belt-Speeder lines of ⅜ to 2½ yd. capacity, in the states of California, Nevada and Arizona.

▼

New Alemite Distributors for Buffalo, N. Y.

Appointment of E. A. Perkins, and F. T. Adams, as Alemite distributors for the Buffalo, N. Y. area, has been announced by F. R. Cross, sales manager of the Alemite retail sales division of the Stewart-Warner Corporation. The new distributors were formerly connected with the Alemite Company of Illinois.

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New Representatives for Ransome

The Ransome Concrete Machinery Co., Dunellen, N. J. manufacturers of the Ransome line of concrete mixers and pavers have announced the appointment of Stuart M. Christhilf & Co., 200 E. Lombard St., Baltimore, Md., to handle their complete line in the state of Maryland; and Wilkinson & McClean, Ltd., 10235 103rd St., Edmonton, Alberta, Canada, to handle their complete line in the Province of Alberta.

▼

Twin Disc Clutch Becomes Part of Link-Belt Transmission Line

Link-Belt Co., Chicago, Philadelphia, announces that in the process of broadening its line of modern power transmission equipment, the Twin Disc Cluth Co., Racine, Wis., has appointed it distributor for Twin Disc friction clutches and clutch couplings in all industrial fields. Engineering data, dimensions, horse power, list prices, are given in Link-Belt's new power transmission book No. 1600.

▼

Riggs Tractor Appointed Link-Belt Shovel Distributor

Link-Belt Co., Chicago, has announced the appointment of J. A. Riggs Tractor Co., 424 E. Third St., Little Rock, Ark., as authorized agent for the sale of Link-Belt Speed-o-Matic crawler-mounted shovels, draglines, cranes. In the smaller sizes (⅜ to 1 yd.), the Riggs organization will continue to handle the Speeder line of crawler- and truck-mounted machines.

▼

Drive Thru Showroom of FWD

The unique "drive thru" showroom inaugurated two years ago at the factory of the Four Wheel Drive Auto Company, Clintonville, Wis., is again this season open to visitors. Here are displayed a complete line of FWD trucks, ranging from the lightest model to trucks of 15 tons' capacity. In this group are units equipped for all phases of highway work, tractor units for commercial hauling service, and trucks fitted with earth boring machines, bodies and derricks for line construction and maintenance. Also prominently shown are trailers, tools and other equipment for public utility service. Other interesting, stimulating displays include photographic exhibits of FWD trucks operating in

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HERE is trailer capacity up to 45,000 lbs. with the ease of loading that comes with light, single purpose trailers—just drop the front, load and jack the bed up and replace the wheels. This feature, combined with other Jahn Trailer advantages, means new speed. There are no ramps to build and the load can be definitely placed without fuss or maneuvering.

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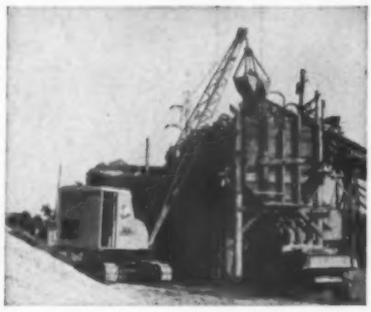
OSGOOD



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DRAGLINES
CRANES, ETC.

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BELT
CONVEYORS

Barber-Greene Belt Conveyors are built for the many peculiar needs of contracting. Their Standardized Sectional Construction gives quick delivery, easy erection, perfect alignment, and ease of alteration. The B-G Conveyor Catalog covers the entire line, Portable and Permanent. Write for your copy.

Standardized Material Handling Machines
BARBER GREENE
Aurora, Illinois

39-10

diversified fields, and a historical museum. One of the world's largest automotive showrooms, the "drive thru" exposition building is 100 ft. wide and 200 feet long. Down the center lane is a two-car driveway.

▼

Link-Belt Promotes Frank O'Neil

Announcement has been made by Link-Belt Co., Chicago, Ill., that Frank S. O'Neil has been appointed general manager of the company's plants in Indianapolis, of which he had been assistant general manager for the last 7 years. Mr. O'Neil joined the Link-Belt organization 33 years ago at the company's Chicago plant, where he worked 10 years in the foundry, machine shop, cost department, and rate setting and production departments. His Indianapolis plant experience dates back to 1916, the year in which he was transferred there from Chicago. While at Indianapolis, he successively served as assistant superintendent in charge of malleable iron chain assembly, superintendent of the Ewart plant, and assistant general manager of both Ewart and Dodge plants.

▼

T. V. Brooke Now Sales Engineer at Chicago Office

The Lincoln Electric Railway Sales Co., Cleveland, O., has announced the appointment of Thomas V. Brooke as sales engineer with its Chicago office at 310 South Michigan Ave. Mr. Brooke is a graduate of Virginia Military Institute and for several years has been associated with The Lincoln Electric Co. as a research engineer. In this position, he has gained valuable knowledge and experience in the design, manufacture and application of arc welding equipment and electrodes.

▼

J. N. Forker Appointed Trustee of East Gas & Fuel Associates

J. N. Forker, a vice president and director of Kopper Company, in charge of the Tar and Chemical division, has been appointed to the board of trustees of Eastern Gas and Fuel Associates, Boston. E. S. Ruffin, Jr., assistant secretary and a member of the legal department of Koppers Company, also has been appointed to the board as assistant secretary.

▼

New Distributors for Link-Belt Co.

Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill., has announced the following appointments: Kenny Machinery & Tractor Co., 2136 Jefferson St., Kansas City, Mo., as authorized agent for the sale of Link-Belt Speed-o-Matic crawler-mounted shovels-draglines-cranes. In the smaller sizes, ⅜ to 1 yd., the Kenny organization will continue to handle the Speeder line of crawler- and truck-mounted machines. The Klinger-Dills Co., 116-120 North Jefferson St., Dayton, O., also has been appointed distributor for the above mentioned equipment.

▼

Buckeye Traction Ditcher Establishes New York Export Office

Export headquarters have been established by the Buckeye Traction Ditcher Co., Findlay, O., at 80 Broad St., New York City. This office will handle the export contacts and sales for Buckeye ditching machines, backfillers, excavators, power shovels, trench hoes, draglines, clamshells, piledrivers, highway surface material spreaders and industrial trailers. All inquiries from outside of the United States should be addressed to the Buckeye Traction Ditcher Co., 80 Broad St., New York, N. Y.

▼

Fletcher Equipment Co. Now Distributor for Hercules Road Rollers

The Hercules Co., Marion, O., has appointed the Fletcher Equipment Co., Inc., 309 Magazine St., New Orleans, La., distributor of Hercules road rollers in Louisiana and southern Mississippi.

▼

Weis Appointed Special Sales Representative for Marion

The Marion Steam Shovel Co., Marion, O., has appointed J. F. Weis, formerly assistant electrical engineer, as special sales representative traveling out of the home office. The duties of Mr. Weis will be to supplement the work of Marion salesmen in the various districts on industrial accounts. He has an excellent background covering many years of experience in contacting the industrial field and is well adapted to his new responsibility.

▼

Elden Now Handling Sale of Sauerman Products in New York City

The sale of the products of Sauerman Bros., Inc., Chicago, Ill., in New York City and vicinity is now being handled by Wm. R. Elden, 11 West 42nd St., New York, N. Y. Mr. Elden, formerly chief engineer and manager of engineering sales of Sauerman Bros., Inc., has opened an office at the above address as a distributor of material-handling and excavating equipment. His many years of experience in the Sauerman organization place him in a position to render valuable service to users and prospective users of Sauerman machinery.

▼

Hoyt E. Hayes Elected President of Industrial Brownhoist

At a special meeting of the board of directors of Industrial Brownhoist Corporation, Bay City, Mich., Melvin Pattison resigned as president and treasurer and was elected chairman of the board. Hoyt E. Hayes, vice-president, was elected president and treasurer. James B. Hayden, assistant sales manager, was appointed sales manager.

▼

United Sales Corp. Appointed Distributors by Hercules Co.

The Hercules Co., Marion, O., has appointed the United Sales Corporation, 7630 Meade St., Wilkinsburg, Pittsburgh, Pa., as distributors of Hercules road rollers in the western half of Pennsylvania.

Goodrich to Have Mechanical Goods Factory in South

The B. F. Goodrich Co. will erect a $1,500,000 mechanical rubber goods factory at Clarksville, Tenn., with present plans calling for production to begin in the autumn. Located on a 30-acre tract in northeast Clarksville, the new plant will be built of brick, concrete, steel and glass. The modernistic building will be 800 ft. long and 200 ft. wide and will contain 200,000 sq. ft. of floor space. Provision has been made for possible future expansion. Products to be manufactured at the new plant include hose, belting, batteries, soles, heels, gaskets, packing, molded goods and a variety of mechanical rubber appliances. A power plant for process steam, and a garage, will also be built

NEW LITERATURE

Tractor Scrapers—Bulletin 815, covering its complete line of hydraulic scrapers, has been issued by the Baker Manufacturing Co., Springfield, Ill. Illustrated and described are the Baker scrapers in 3, 5, 8, and 10 cu. yd. capacities, for use with tractors of 25 to 30 h.p. and up to 75 h.p.

Crushers—Bulletin 263-E, featuring the Telsmith gyrasphere crushers, has been issued by the Smith Engineering Works, Milwaukee, Wis. The various features of the crushers are illustrated and described in this 16-page bulletin, and specifications are given.

Leaning Wheel Graders—A 24-page illustrated catalog, completely describing three models in 8, 10, and 12 ft. blade sizes, with power or hand controls, has been issued by J. D. Adams Co., Indianapolis, Ind. Action and still pictures show the many types of work being done with these graders and clearly illustrate the mechanical and operating features.

Marking Devices—The Dickey-Grabler Co., Madison Ave., at West 103rd St., Cleveland, O., has issued an 84-page catalog featuring marking devices of all kinds, dies, tools and metal stampings.

Structural Redwood—A catalog on the uses of redwood has been issued by the Structural Department of the California Redwood Association, 405 Montgomery St., San Francisco, Calif. The catalog also includes technical data for the calculation of wood columns and beams and also the structural grading rules for redwood.

Portable Air Compressors—Schramm, Inc., air compressor manufacturers, of West Chester, Pa., are distributing a new 22 page catalog which presents their complete line of "Utility" portable air compressors. Sizes from 85 to 420 cu. ft. capacity are listed, available with either gasoline or Diesel engine power. A complete assortment of portable mounting types is listed for all sizes. Operating data, detailed specifications and pictorial design features are included. A feature of the catalog is a 2-page spread of a compressor printed in the actual color of the finished product. Ask for bulletin 3900-RS.

Southern Pine—Distribution of the 1939 revised official grading rules for Southern pine lumber, is being made to distributors, specifiers and consumers. The new rules became effective July 1. H. C. Berckes, secretary-manager of the Southern Pine Association, P. O. Box 1170, New Orleans, La., states that numerous changes are embodied in the new grading and it is important that all persons having to do with the manufacture, buying, selling, specifying or use of Southern pine lumber in construction, should familiarize themselves with the revised grading rules.

Patrol Sweeper—A new fact-finding catalog with 40 (on the job) operating illustrations showing what the patrol sweeper is, but more particularly presenting what it can do, has just been issued by The Austin-Western Road Machinery Co. of Aurora, Ill. The book deals with costs; discusses working speeds; provides necessary descriptive information and specifications; covers types of service it provides; explains and illustrates its adaptability for a wide range of uses; shows how many cities are meeting their street cleaning problems, and provides other information which gives a very good idea of what the sweeper is and does. Brief, to-the-point descriptions, with due regard for the reader's time, enable anyone to go through the pages very quickly. The manufacturers will gladly send a copy to any interested person if requested on official stationery.

Data on Tires—The B. F. Goodrich Co., Akron, O., has just published its 1939 edition of the "Operators' Handbook," designed to provide information for the users of all types of tires other than those for passenger cars. Copies can be obtained upon request to the manufacturer. The volume is 4 in. wide and 6½ in. long, and contains 96 pages. Ten pages are devoted to a general discussion of tire problems, the importance of cord construction and other features of tire building for the commercial field, including a chapter on the need to fit the tire to the job to be performed, and another on the functions of the Goodrich tire calulator in helping solve that problem as well as others. Twenty-four pages describe the company's line of truck and bus tires, with complete specifications, including those for the new line of super-traction tires recently introduced. Eight pages are devoted to data on the new tractor-grader super-traction and other types used on commercial tractors. Discussion and specifications for industrial tires and the wheels on which the solid tires for this purpose are vulcanized covers 15 pages, while similar information on pneumatic wheelbarrow tires takes up six pages. Load ratings and inflation pressures for tires in commercial service, tables on tires, rims and dual spacing, load and service diagrams, and load analysis occupy six pages, while tables on weights and measures of various commodities and materials take up three pages.

Mowers—Two new catalogs dealing with its products have been issued by the Worthington Mower Co., Stroudsburg, Pa. One of these has to do with the Worthington equipment for highway mowing. Illustrated and described in this

LOAD the CHEAPEST WAY—

The cheapest loading method is the one that holds the trucks for the shortest time. Truck time is the important factor in loading costs. Since 1919 Barber-Greene Loaders have continuously earned this reputation. Write for complete information, there is no obligation.

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Aurora, Illinois
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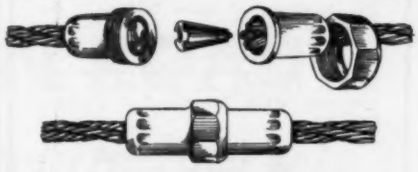
Guard Cable Splice of Approved Design



This Wedge Type Union Cable Splice for standard 3-strand, 7-wire ¾" guard cable is the simplest, most easily installed and most economical cable splice we know about that will meet specifications requiring safety factor over cable of 25,000 lbs. rating.

Now used regularly in seven States and acceptable in others. Should be standard with any State now using the ¾" guard cable construction—both for maintenance and for new construction.

Sample will be sent free for field test by responsible Highway Official or Contractor; or trial order of any quantity at 66c each, F.O.B. Branford. Lower prices in quantity and through distributors.

Send for Data Sheet No. H-1

Other M.I.F. Specialties include: Cable Offset Fittings, Compensating Spring Anchorages, Wedge Type Cable End Sets, Offset Pipe Railings, etc.

MALLEABLE IRON FITTINGS CO.
Pole Hardware Dept.
Branford, Conn.

are the Chieftain (a complete tractor and sickle bar mowing unit) and the Highway Ranger, which has a short tractor with sickle bar feature the same as the Chieftain, but in addition has three rotary type cutting units for short grass of islands and borders and beautification areas. Specifications for both mowers are given. The other catalog deals with the Worthington mowing equipment for parks and municipalities. Descriptions, illustrations and specifications of various mowing units are given. In addition illustrations and descriptions are included of many useful accessories which are used with Worthington tractors and mowers. These include dump body carts, rotary brush, gang roller, sprayer and V-type snow plow.

Barber-Greene Tamping Leveling FINISHER

The hundreds of miles laid with the Barber-Greene Finisher are unquestioned proof of the outstanding merit of its ingenious design. The perfection of B-G Leveling, and the permanence of B-G Tamping are particularly conspicuous. Write for the B-G Finisher Booklet.

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BARBER GREENE
Aurora, Illinois

39-12

Diesel Engines, Tractors, Road Machinery—From the buying of the steel to the assembling of the finished parts, the craftmanship that goes into "Caterpillar" Diesel engines, track-type tractors and road machinery is briefly discussed in a booklet issued by Caterpillar Tractor Co., Peoria, Ill. Visitors to the company factory at Peoria, Ill., are invariably interested in the measures taken to assure high quality, and the new book briefly illustrates and explains many of the most interesting tests conducted. Photographs show how the various tests and exact manufacturing processes are carried on, and brief captions tell the results of the work done, and the reason why such precision is essential.

Portable Electric Tools—The complete 1939 line of Thor portable electric tools is described in an attractive 48-page catalog just issued by the Independent Pneumatic Tool Co., 252 S. Jefferson St., Chicago, Ill. The book, divided into four major sections, gives complete descriptions, specifications and prices on the entire Thor line of universal type electric drills, drill stands, screw drivers, nut setters, tappers, saws, hammers, grinders, polishers, sanders, heat guns and electric tool accessories. Also shown in the catalog are a wide variety of attachments available for use with Thor screw drivers and nut setters. These include angle attachments for operation in hard-to-reach places, attachments for driving screws and nuts to predetermined tensions and so on. Profusely illustrated with pictures of tools in operation on various types of work, as well as with pictures of the individual tools, the book has been called a helpful guide for the user of electric tools. It contains much pertinent information on the uses and construction of Thor tools.

Concrete Mixers—Five new catalogs illustrating and describing its mixer have been issued by Chain Belt Co., Milwaukee, Wis. The mixers described are the Rex 5½ S-mixer, the Rex 5-S mixer, 7-S mixer, 10-S mixer, 14-S mixer, the complete line of moto-mixers and the Rex 27-E Pavemaster. Outstanding among these catalogs is the new Rex moto-mixer catalog No. 340 which explains in detail the mechanics and operation of the new 1939 moto-mixer. In it is given a partial list of Rex moto-mixer users together with a map showing where these users are located.

Cost Keeping Records for Tractors and Power Unit—International Harvester Co., 180 North Michigan Ave., has developed a simple industrial power cost record book that enables the tractor and power unit owner to obtain without much extra labor an accurate and comprehensive statistical picture of how his power equipment is operating and how much each tractor and each stationary engine is costing. For use with this book a printed form to be filled in daily by the tractor or engine operator has also been devised, and both these drivers' daily report forms and cost books are available free of charge to owners whether they operate international equipment or not.

Crushers and Crushing Plants—A new 12-page "tabbed" folder, No. SF 39, has been issued by the Universal Crusher Co., Cedar Rapids, Iowa. Universal's new line of weight-saving "streamlined" portable crushing units as well as many types of stationary and portable plants are pictured and discussed.

Distributors, Kettles, Spray Tanks—Several attractive pieces of literature dealing with its products have been issued recently by Littleford Bros., 454 E. Pearl St., Cincinnati, O. Bulletin O-15 illustrates and describes the Model "M" pressure distributor, and gives specifications, dimensions and weights. The Model "C" distributor in two circulars. One of these is quite unusual. It is entitled "Here is the Story in a Nutshell," and the circular is shaped to conform with the title. Other circulars illustrate and describe the Model No. 101 utility spray tank, and the Model 84-HD kettle.

Seamless Flexible Metal Tubing — A new 24-page catalog elaborately illustrated with 75 up-to-date pictures and charts has just been published by the American Metal Hose Branch of the American Brass Co., Waterbury, Conn., covering seamless flexible metal tubing. The catalog contains complete discussions on the proper use of the product for conveying steam, liquids, gases; controlling vibration, connecting misaligned and moving parts, and the part that seamless plays in product design. There are also complete engineering data and specifications, with simple installation rules.

Timber Bridges — A survey of typical types of highway bridges in the United States, which are built of pressure treated timber, has just been compiled into a booklet by the Wood Preserving Corporation, a Koppers Co. subsidiary, Koppers Bldg., Pittsburgh, Pa. Engineering data, photographs, records of service life and maintenance, as well as savings in construction, are included in the publication. Bridges selected for the survey embrace various types which have been built under a variety of conditions.

Banishes the Road Widening Problem

THE TROJAN ROAD WIDENER

Originally built in 1933, developed and improved since then on actual work, the TROJAN has proven without a doubt that for RAPID, ACCURATE, ECONOMICAL Road Widening Excavation—

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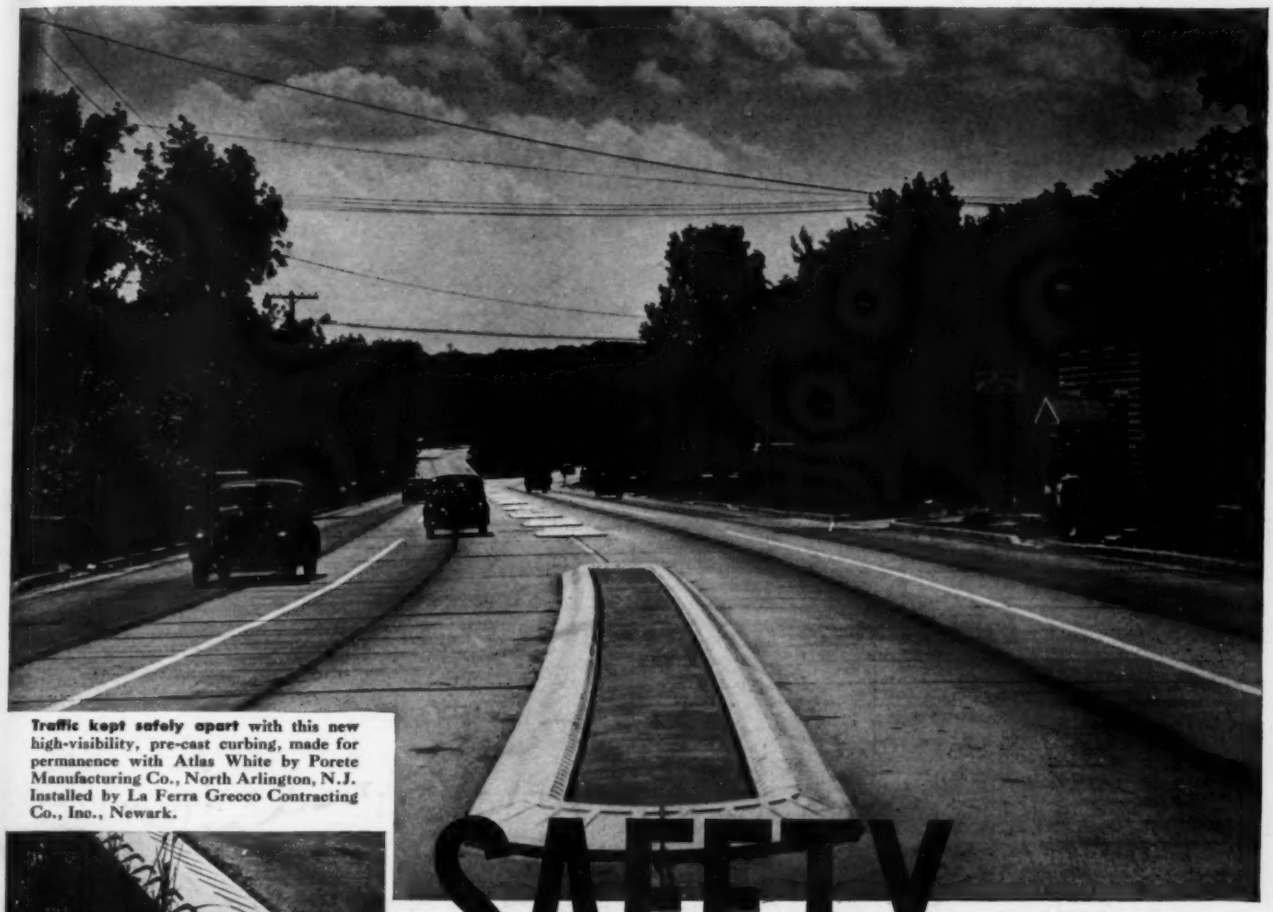


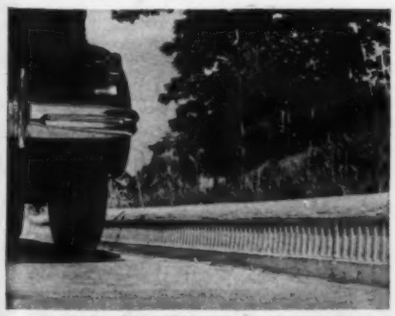
Traffic kept safely apart with this new high-visibility, pre-cast curbing, made for permanence with Atlas White by Porete Manufacturing Co., North Arlington, N.J. Installed by La Ferra Grecco Contracting Co., Inc., Newark.

SAFETY

ON THE OPEN ROAD

with curbing of white concrete

Close-up view of pre-cast center curbing shows how new vertical-faced ribs are designed to reflect car lights back so motorists can see the complete outline of the curb . . . even in extremely bad weather.



Road-side curbing also has new vertical ribs to reflect light. This curbing was cast in place. Made with Atlas *White*, it will keep its bright white appearance without painting or replacing—for years and years.

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Why is this new curbing so successful? Because it's designed with vertical-faced ribs that increase night visibility by reflecting car lights back toward motorists. And because it's made with Atlas White portland cement that increases visibility in all sorts of weather . . . and that does so *permanently*—thus ending the need for frequent painting, repairing and other upkeep costs!

Plan to keep your traffic moving smoother . . . safer . . . at lower upkeep costs—with this new curbing made with Atlas White. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

RS-M-6

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ROADS and STREETS

With which have been merged GOOD ROADS and ENGINEERING & CONTRACTING

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